IFAC International Federation of Automatic Control
Secretariat: Schlossplatz 12, A-2361 Laxenburg, Austria — Phone (02236) 71 4 47, Telex 79248 ifac a

1986
No. 6
Dec.

Newsletter

Contents:

Impressum:
Medieninhaber und Herausgeber:
International Federation of Automatic Control (IFAC), Genf
Schlossplatz 12, A-2361 Laxenburg, Austria
Verlagsort und Redaktion:
Dipl.-Ing. Gusztáv Hencsey
Schlossplatz 12, A-2361 Laxenburg
Hersteller:
Artur Schefczik & Sohn
Kollergasse 7; A-1030 Wien

Editor: Gusztáv Hencsey
Layout: Margaret A. Gottfried
published bimonthly

IFAC '87 10th World Congress - Second IPC Meeting in Zürich, August 29, 1986

Program for Munich in the Making

Preparations for Munich are well under way - this was the general conviction of the IPC members after their second meeting at the ETH Zürich, August 29, 1986. IPC-Chairman R. Isermann (FRG) pointed out the remarkably strong international response to the Second Call for Papers: 1100 papers had been submitted thus providing a heavy load of work for the Sub-IPCs. Innovations such as the subdivision into subject areas and the use of key-words had proved to be significantly helpful for the review procedure. 530 contributions could be accepted — the GASTEIG room capacity and consequently the total number of sessions had been the final basis for this acceptance rate. IPC Secretary R. Kofahl (FRG) explained the procedures taken after the deadline of May 24, 1986, and outlined the distribution of papers and sessions planned for each subject area.

Additional proposals for case-studies and discussion sessions as well as industrial problem discussion sessions were made; those which were finally accepted in Zürich are well in line with the aim of the IFAC '87 Congress: to emphasize the relevance of industrial applications in all fields of automation.

Enhancement of detailed information should be provided by the survey papers, these being a novel feature at an IFAC World Congress. 37 survey papers, distributed over the subject areas, had been proposed and invited a priori. The IPC members fully agreed upon these contributions which will cover a good deal of IFAC's present interests and also include new fields such as robotics and artificial intelligence.

Highlights of IFAC World Congresses are traditionally the plenary lectures. The IPC Chairman announced the titles of the 5 plenary papers for the Munich Congress — this well-balanced selection undoubtedly promises to be an interesting presentation of the general state-of-the-art and future development of automatic control for a large audience.

The participants of the second IPC Meeting finally agreed on the concept of the Technical Program for Munich. At the end of a lively discussion and a productive and stimulating day IFAC President M. Thoma gratefully acknowledged the efficient preparatory work of the sub-IPCs and the cooperative support by the Technical Committees.

A third IPC Meeting which had originally been planned will not be necessary.

Control in Transportation Systems

5th IFAC/IFIP/IFORS Conference

Vienna, Austria, July 8—11, 1986

At this conference 110 delegates from 23 countries met to discuss a broad range of topics. In addition to the challenges and opportunities posed by the rapid development in microelectronics and information technologies, the subject of national transportation systems planning was given particular attention. One of the motivating factors for emphasizing the subject of national transportation systems planning is the fact that the General Transportation Systems Plan of the host country, Austria, is now in its final phase of development. The plan has reached a state in which interesting results could be reported in the form of a case study and of several individual research reports.

Reports on similar endeavors completed or under way in other countries were solicited by the International Program Committee to round up the discussions. Moreover, reports on more limited projects of modeling for management and decision making regarding environmental, social, and economic aspects of transportation systems were also invited.

Survey papers and round table discussions were organized to illustrate the potential benefits which the transportation community can derive from such fields as logistics, robotics, and telecommunications.

The view of logistics suggests that for a shipper transportation efficiency is secondary as an objective to the overall efficiency of the logistics system. Conversely, it may not be possible to justify expensive new transportation systems unless the shippers can be motivated to change their logistics system so that they can take best advantage of the opportunities it presents. Similarly,

ctd. p. 2

ctd. from p. 1
a shipper's needs are rarely satisfied by just one transportation link or one mode of transportation. A multi-model approach to transportation is therefore called for.

Standardization is recognized as an important prerequisite for effective multi-modal transportation. While in the past standardization efforts were mostly directed towards physical aspects of the modal interfaces, the current need is seen mainly in the areas of information processing and informatics.

A lack of standardization was also recognized in the interface between the human and the various machines and facilities used in transportation. Specifically, it was concluded that users and operators of transportation systems are often not considered adequately. It was suggested that the sponsor organizations of the conference might be in a position to fill the void, as is already done by the IFAC Workshops on Safe Computer Systems.

The use of robotics in transportation is seen to be concentrated in the manufacturing of equipment. Only to a limited extent is robotics being used in maintenance. A considerable potential for the application of robotics is recognized in the operational area of a transportation system. The features of a robot considered most important in such applications are mobility and the ability to recognize visual images.

At the round table on the use of Videotex (BTX) for logistics and passenger services it was pointed out that multifunctional use of infrastructure already available might be more beneficial than new systems which, even at large expense, would offer less access than does the available infrastructure. Also, it was suggested that, even if videotex systems are designed in a user-friendly manner, infrequent users or users with more complicated needs might not be able to use the system entirely on their own. Hierarchies of systems might be used to maintain the role of the transportation professional as an intermediary to the user in these situations.

The presentation of a psychologist working in the field of highway safety showed the limitations of learning and training. In the subsequent discussion it was pointed out that electronic equipment already available might be used to a greater extent to make traffic safer and more human.

In connection with this conference a Seminar on the Application of Artificial Intelligence in Transportation and a Workshop on Operational Control Systems for Local Traffic was arranged to attract German speaking participants to attend also the Conference itself.

The emphasis of the series of conferences on control in transportation has been on the transfer of knowledge about transportation between researchers and developers, and between users and scientists. This fifth conference represents a significant progress. It also points to the great need for further work. The International Program Committee, in its meeting at the end of the conference therefore decided unanimously that the organization of a sixth conference for 1989 should be proposed to the sponsoring organizations.

R. Genser
IPC chairman

Information Control Problems in Manufacturing Technology

5th IFAC/IFIP/IMACS/IFORS Symposium

Suzdal, USSR, April 22-25, 1986

The aim of the Symposium was to consider the state-of-the-art and trends in the fields of robotics and flexible manufacturing systems (FMS).

The Symposium was organised by the Academy of Sciences of the USSR and other Soviet organisations. The National Organising Committee was chaired by Academician V. A. Trapeznikov.

229 scientists from 14 countries participated in the Symposium. Unfortunately, only 56 of them had arrived from abroad — many of the expected participants (including some of those whose papers had been included in the program) had not come due to financial or other reasons.

The participants were welcomed at the opening session by IPC Chairman I.M.Makarov, IFAC Vice President B. G. Tamm, IMACS President R. Vichnevetsky and NOC Vice Chairman N. A. Kuznetsov.

11 invited papers were presented during the plenary sessions. The 74 papers presented at the symposium sections were devoted to:

- Theoretical aspects of FMS and robotics
- FMS structures and principles
- Development of FMS subsystems
- FMS and robotization of technologies: case studies
- Sensory-information systems of industrial robots for FMS
- Control of mobile and sensory based robots
- Software for FMS and robots
- Simulation of FMS and robotic systems
- Design methods for FMS and robotic systems.

Two Round Table Discussions (Criteria to Evaluate a Flexible Manufacturing System, and Vital Problems in Software for Robots and FMS) and one General Discussion (Concepts, State of the Art and Development Trends in FMS and Robotics) were also held which met with great interest on the part of the symposium participants.

The preprints were available to all the participants. The Proceedings of the Symposium will be published by Pergamon Press.

Andrey A. Petrov
Symposium Scientific Secretary

Software for Computer Control-SOCOCO '86

4th IFAC/IFIP Symposium

Graz, Austria, May 20—23, 1986

The prime organizer of this event was the Austrian Academy of Advanced Management (ÖAF), the Technical Programme was arranged by Professor V. H. Haase of the Institute for Information Processing of the Technical University, Graz, and the Chairman of the International Programme Committee, Professor E. Knuth of Hungary.

Despite the relatively low attendance, approximately one hundred, there is no doubt that SOCOCO '86 was a highly successful event from a technical point-of-view. Of particular importance was the extremely high standard of the invited papers. I would like to highlight the papers presented by Professor Peter Elzer (FRG) in the area of Software Project Management, that of Professor Pao (USA) in the Use of Artifical Intelligence and the paper by Dr. H. Halling (FRG) in the area of MAP.

An interesting innovation of this event was that following each invited paper, a panel discussion was set up involving three or four brief presentations from experts in the fields, relating back to the invited-paper's subject matter. Invariably, these panel discussions evoked very interesting comments from the floor and surely enhanced both the invited speaker's paper as well as provoking a general discussion. Overall, SOCOCO '86 was notable for its extremely high level of personal interaction and it spawned many very successful, informal discussion periods.

From a technical point-of-view, there were two major focal points. In the first place, the whole problem of managing software projects received much attention and evoked much comment. Peter Elzer had come from the Workshop on the Management of Software Projects, held in Heidelberg (and this is clearly an area which the Computers Committee must follow up on). It is clear that there is great concern in the profession for improving the approach to the development of particularly large-scale software and that the responsibility of those involved has been brought home very clearly by recent failures such as at the Chernobyl Plant in the U.S.S.R. and the Space Shuttle in the USA. The role of IFAC in ensuring attention to the development of highly reliable, professional software was stressed throughout the event and much interest was shown in IFAC taking a lead in this area.

Much interest was also shown in the use of Artificial Intelligence Methods in Control and Professor Pao's paper emphasised the fact that, although words such as Expert Systems, AI, etc., are being thrown about with gay abandon, relatively few real results are being produced and that it is a field which is very much a „band wagon" at the present time. However, it is clearly a subject of importance (and one which the Computer's Committee must take very seriously in the near future).

In summary, SOCOCO '86 must be viewed as a highly successful venture from the point-of-view of the technical level but, unfortunately, through the consequence of a series of unfortunate events, suffered from poor attendance. From an organisational point-of-view, it was a very slick operation and greatly enjoyed by those who managed to attend.

V. H. Haase
NOC Chairman

Experience with the Management of Software Projects

IFAC Workshop

Heidelberg, FRG, May 14—16, 1986

For several years the need of a forum for the exchange of experience with the management of software projects has been recognized among practitioners in the European software scene. Therefore IFAC as a primarily applications-oriented organization (at least as far as data processing is concerned) decided to take the lead and to organize a workshop on this subject as a kind of experiment. It was organized by the German Federation of Engineers (VDI/VDE-GMR), the national NMO. The IPC-chairman was Peter F. Elzer from the Brown Boveri Central Research Laboratory (ZFL/L3) in Heidelberg.

The workshop turned out to be a success. It not only demonstrated the feasibility of assembling enough managers and having them present and discuss their experiences, but it also showed that by far the majority of them liked to have this opportunity and expressed the wish to make this type of conference an established and regular event. The organizers of the workshop have therefore started the necessary steps towards this goal.

There were four invited papers. Their contents had been discussed beforehand with the authors in order to make them fit together and to highlight certain topics out of the broad area of software management. They were:

Heidi Hennenberg, Krupp-Atlas-Electronics, Bremen, FRG: Software Project Management — There is More to it than just Technology.

David J. L. Martin, Brown Boveri & Cie, Mannheim, FRG: Practical Improvements in the Management of Real-Time Software Projects.

Malcolm Key, British Telecom, Ipswich, UK: The Reasons why Software has a Bad Name.

Per Svensson, Swedish Defense Res. Inst., Stockholm, Sweden: Creative Research and Product Development in Software Projects — the CANTOR Experience.

In total there were sixteen submitted papers, covering e.g. the following topics:

- Differences between the mentality of managers and that of engineers
- The reaction of people to new rules and guidelines
- Aspects of embedding a software development organization into a large user organization
- Experience with the use of special tools in real application projects
- Validation of Software
- Summaries of the experience with several completed projects
- Interrelations between technical development and the political and economic environment.

Triggered by the intensive interest of the participants it was spontaneously decided to organize subgroup discussions on the following topics: Re-use of Software, Human Factors, and Future Trends. The results of the subgroup discussions were presented to the plenum by the respective chairmen and discussed there. They will be included in the proceedings of the workshop.

During the workshop two questionnaires were distributed in order to sound the opinion of the participants and to collect some data on tools used, productivity factors etc. This action also turned out to be a remarkable success. The general criticisms were very positive and constructive and the data collected were so numerous that it will take some time to evaluate them properly. Therefore only part of them will be included in the proceedings.

P. F. Elzer
IPC and NOC Chairman

Stochastic Control

2nd IFAC Symposium

Vilnius, USSR, May 19—23, 1986

This Symposium was sponsored by the IFAC Technical Committee on Theory with participation of the IFAC Technical Committee on Systems Engineering (SECOM) and the Technical Committee on Mathematics of Control (MOC). It was organized by the USSR Academy of Sciences, the USSR National Committee on Automatic Control (NCAC) and the Lithuanian Territorial Group of the USSR NCAC of IFAC.

In addition a Plenary Session was held, during which the orientation towards the investigations of Nonlinear Stochastic Systems Theory and its Application in Economics and on Large Technical Systems (V. S. Pugachev, USSR; J. Sunahara, Japan) was discussed.

V. A. Trapeznikov chaired the National Organizing Committee, supported by N. A. Kuznetsov and L. A. Tel'ksnis while the International Programme Committee was chaired by V. S. Pugachev (USSR).

200 participants of the Symposium from 12 countries presented 120 papers, which were divided into 8 sessions.

Some new original theoretical results were obtained, too (on the foundation of Prony's method by V. Slivinskas, USSR; Inertial Theorem for Stability of Discrete Stochastic System by Xi Guangcheng, P.R.C.).

The discussion on "Optimal Control from the Point of View of Mathematics and Engineering" initiated by V. S. Pugachev was attended by over 100 participants.

The Symposium has shown the progress not only in traditionally developed methodological and pure reserarch fields of stochastic control but also the rapid growth of its importance for different practical applications. Thus, the symposium in general met the purpose set by the sponsors and organizers.

Proceedings of the Symposium are to be published by Pergamon Press.

L. Sakalauskas
Institute of Mathematics and Cybernetics of the Academy of Sciences of the Lithuanian SSR

Reliability of Instrumentation Systems for Safeguarding and Control

IFAC Workshop

The Hague, Netherlands, May 12–14, 1986

This workshop, which was sponsored by the IFAC-Applications Committee (APCOM), was the first of its kind. It was organised as a cooperation between the Netherlands Association of Engineers and the Royal Institution of Engineers in the Netherlands. Due to some dramatic events in industrial processes in the weeks before the workshop, the public awareness of the reliability problem in instrumentation systems is steadily increasing. This was felt strongly during the informal talks throughout the workshop. Many presentations emphasized that, although a lot of theoretical work has been done, the practical aspect of reliability and availability and its assessment are in many circumstances a huge problem. Many fields are only at the beginning of being explored. It is also an area where a large number of disciplines strongly interact. As most participants came from industry, this also reflected another important issue of reliability: the high impact and need in today's industrial life.

In this context some 113 participants from 18 different countries gathered at The Hague. The three-day programme was rather impressive: 33 quality papers from 12 countries were presented to an audience which was almost 100% present at every session. The programme was divided into a number of sessions covering the following topics:

- Reliability engineering tutorials;
- System design/hardware;
- Field data and maintenance;
- Human factors.

Furthermore, on one of the evenings a special so-called "problem session" was organised. Here, the purpose was to stimulate the participants to present some "real-life" reliability problems and the possible solution they envisaged. Also, a kind of practical exercise was played, where, starting from a given problem, the audience was invited to search for a suitable "reliable" solution during the following two days of the workshop. At the end of the workshop, many ideas, sparks and possible escapes resulted. Generally, the discussions, questions and answers, were always felt to be too short, which in fact ultimately proved that the audience showed great interest and enjoyed it.

At the end of the workshop the evaluation of this new IFAC-event clearly demonstrated that a number of interesting topics are still open: e.g. new architecture methodologies for improving reliability, and especially the software aspect, which is practically unexplored in today's computer age, although of highest importance. Therefore a second workshop of this kind will follow in 1988 and it is proposed to be organized in Belgium.

L. BOULLART
IPC-Chairman

Control of Distributed Parameter Systems

4th IFAC Symposium

Los Angeles, Ca, USA, June 30 — July 2, 1986

The Symposium was held at the University of California at Los Angeles (UCLA). It was supported by IFAC Technical Committees on Applications, Mathematics of Control, Space, and Theory, and was organized under the auspices of the American Automatic Control Council, the IEEE Control Systems Society, and the Jet Propulsion Laboratory (JPL) of the California Institute of Technlogy.

The symposium was a great success with 125 participants representing ten countries and a total of 90 papers presented over the three days. Prof. H. T. Banks of Brown University was Chairman of the International Program Committee. The Chairman of the Organizing Committee was Herbert E. Rauch of Lockheed Palo Alto Research Laboratory, the Co-Chairman was Guillermo Rodriguez of JPL, and the Local Arrangements Chair was Deirdre Meldrum of JPL.

The Keynote Speech on Control Opportunities in Advanced Aerospace System was given by Dr. William H. Graham, Deputy Administrator of the National Aeronautics and Space Administration (NASA), Washington, DC, highlighting control challenges which will be faced with future high performance aircraft and space missions. Seven Plenary Speeches highlighted important aspects of control, identification, and modelling for distributed parameter systems. Over the three days there were twenty four sessions of contributed papers treating flexible structure, other physical systems, identification and stochastic systems, and optimal control and stabilization. An interesting development was the relatively large number of papers treating applications to aerospace systems.

Social highlights included an informal get-acquainted gathering, a reception, a banquet, and an informal closing gathering. The Symposium Proceedings containing Plenary Papers and selected contributed papers will be published by Pergamon Press Ltd., Headington Hill Hall, Oxford OX3 OBW, England.

Herbert E. Rauch
NOC Chairman

automatica

The Journal of IFAC the International Federation of Automatic Control

Papers from the Next Issue — Jan. 1987

Papers

Survey Paper

Implementation of Digital Controllers — A Survey
(H. Hanselmann)

Papers

A Procedure for Simultaneously Stabilizing a Collection of Single Input Linear Systems using Nonlinear State Feedback Control
(I. R. Petersen)

The Graph Model for Conflicts
(D. M.. Kilgour, K. W. Hipel, L. Fang)

The Linear-Quadratic Optimal Regulator for Descriptor Systems: Discrete-Time Case
(D. J. Bender, A. J. Laub)

From Time Series to Linear System, Part III: Approximate Modeling
(J. C. Willems)

Brief Papers

Dynamic Equilibria for Linear Systems and Quadratic Costs
(D. G. Luenberger)

A 4(n+1)-Dimensional Model Reference Adaptive Stabilizer for any Relative Degree One or Two, Minimum Phase System of Dimension n or Less
(A. S. Morse)

Technical Communiques

Book Reviews

Two-Dimensional Linear Systems by T. Kaczorek
(M. Sebek)

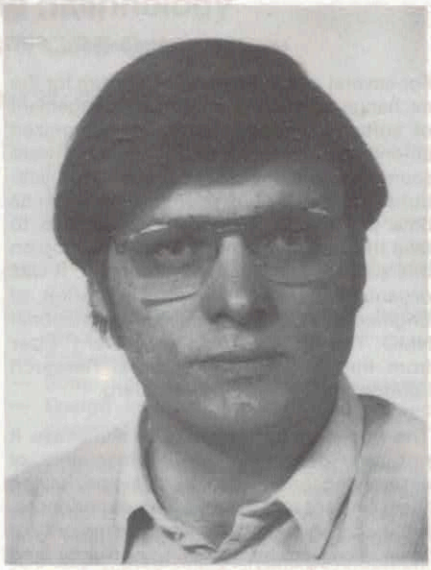
Anticipatory Systems by R. Rosen
(T. Vamos)

Real-Time Dynamics of Manipulation Robots by M. Vukobratovic and N. Kircanski
(A. Sinha)

Application of Optimal Control Theory in Biomedicine by G. W. Swan
(R. Jones)

Season's Greetings to all our Readers

WHO IS WHO IN IFAC



Prof. Aarne Halme
Member of the
Publication Committee

Aarne Halme was born in Helsinki in 1943. He received his Dipl. Eng. degree in electrical engineering in 1966, his licentiate of technology degree in 1969 and his doctor's degree in technology in 1972, all from the Helsinki University of Technology. He was appointed associate professor of control engineering at the Tampere University of Technology in 1972 and became professor of control systems and engineering at Oulu University in 1977. In spring 1976 he was visiting scientist at the UMIST-Control Systems Centre, Manchester (GB). In 1985 he became professor of automation technology at the Helsinki University of Technology, where he currently is the head of the laboratory of automation technology. In addition to his university functions Prof. Halme is also working part time as consultor and advisor in the Industry and Technical Research Centre of Finland.

Prof. Halme has been working in the fields of control theory, process control and automation technology. His main contributions to theory have been in nonlinear systems theory, nonlinear filtering and adaptive estimation. Applications and technical development projects have concerned process control, especially biotechnical and environmental processes, digital instrumentation systems, fault detection and robotics. Many of those have been conducted in close cooperation with industry and have led to successful further developments. Results have been published in over 100 papers and technical reports.

Prof. Halme is a member of the Finnish Academy of Technical Sciences, the New York Academy and several other Engineering Societies. He has served in many positions in the Finnish Society of Control Engineering, and is at the moment the Chairman of the Committee of International Affairs.

His IFAC activities include: participation as a member of several technical committees as well as the publications committee. He has served as vice-chairman and acting chairman of the theory committee and as a member of IPCs in numerous IFAC events. In 1982 he organized the 1st IFAC Workshop in Modeling and Control of Biotechnical Processes.