IFAC International Federation of Automatic Control

Newsletter

No. 5
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Contents:

CONFERENCE HIGHLIGHTS

IFAC Symposia and Workshops, often cosponsored by other International Federations such as IFIP, IMEKO, IIASA, belong to the most important features of IFAC activities. Attended by anything between 50 and 500 participants each, they constitute opportunities for scientists and users all over the world to meet, to exchange views and experiences, and to discuss problems of theory and application in their particular field of interest. Selected papers are usually published in the IFAC Journal AUTO-MATICA in full length while the „Newsletter" will provide overview reports and highlights, if supplied by conference organisers, programme committee chairmen or any other participant. For this issue we are indebted to Prof. **Van Cauwenberghe** of Antwerp and to Prof. **Rembold** of Karlsruhe who furnished the following reports.

PRP Conference Shows Trend Towards Computer Control

The 4th IFAC Conference on Instrumentation and Automation in the Paper, Rubber, Plastics and Polymerisation Industries (PRP) took place in the newly built and very convenient International Congress Centre in Ghent, Belgium (June 3-5, 1980). It was sponsored by the Applications Committee of IFAC.

20 countries were represented among the 240 participants. 53 papers and 10 particularly interesting survey papers were presented. Furthermore nine round table discussion sessions offered the possibility to exchange views on controversial issues. Expecially the use and implementation of process computers and microcomputers aroused much interest and was heavily debated on.

The ten survey papers presented were mostly extremely well-documented and of very high quality. The topics treated can all be considered as highlights of the conference:

– "On-line measurements of processes and products in the pulp and paper industry" by H. Walbaum, International Paper Company, Tuxedo Park. N.Y., USA

5 IFAC Presidents met in Cleveland

During the recent meeting of the IFAC Executive Council in Cleveland it so happened that five IFAC Presidents – past, present and future – attended at the same time (left to right: Y. Sawaragi, 1978/81; J. Lozier, 1972/75; H. Chestnut, 1957/58; J. Coales, 1963/66; T. Vamos, President elect for 1981/84).

Conference Highlights (ctd.)

- "A survey of craft cooking control models" by E. Jutila, University of Oulu, SF
- "Integrated computer control systems in the pulp and paper industry: state of the art, trends and problems" by L. Haglund and O. Alsholm, Billerud, Säffle, S
- "Energy management technology in pulp, paper and allied industries" by A. Kaya, University of Akron, OH, USA and M. Keyes, Bailey Controls, Wickliffe, OH, USA
- "Hierarchical production control for integrated pulp and paper mills" by P. Uronen, IIASA, Laxenburg, A and Oulu University, SF
- "On-line fault detection and pattern recognition on moving webs" by S. Carlisle, SIRA, GB
- "Digital measurement and control of electrical drives for PRP-industries" by G. Brandenburg, University of München, D
- "Extruder control" by S. Dormeier, Paderborn Institute of Technology, D
- "Dynamic modelling of polymerisation reactors" by W.H. Ray, University of Wisconsin, Madison, WI, USA
- "Control of bulk polymerisation processes" by K. Hoogendoorn, DSM, Beek, NL and R. Shaw, ICI, Welwyn Garden City, GB

Adding the 53 papers presented in 20 technical sessions a total of 63 papers were offered. Mostly 2 or 3 sessions were organized in parallel, such that pulp and paper people on the one side and those interested in rubber, plastics and polymers on the other side had their own application sessions, while the computer control sessions were mostly held together.

From the papers presented, it appeared clearly that the process computer is increasingly used, mainly for stabilizing and supervisory control but also for production control and energy management.

A strong trend towards (distributed) basic digital control was clearly discernible. The availability of cheaper microprocessors was not only felt in the control field but also in the measurement area. Many new microprocessor-controlled measurement techniques were presented.

Information Control Problems in Manufacturing Technology

Research projects on different subjects of automation efforts in manufacturing were presented at the Second IFAC/IFIP Symposium held at Stuttgart (FRG) from October 22–24, 1979. The results of these projects are important building blocks for programmable manufacturing systems. The areas covered were as follows:

Recent developments in research on flexible manufacturing systems

One paper presented an overview on the US Air Force program on integrated computer aided manufacturing. This program comprises all aspects of aircraft manufacturing. In the paper three projects on industrial robots were discussed. They include the application of current robotic systems, the use of off-line programming (including vision and adaptive feedback) and an analysis on how robots can be used in aircraft sheet metal assembly.

Recent trends in manufacturing technology in Japan were highlighted by a paper from the Institute of Industrial Science of the University of Tokyo. The presentation included the present status of manufacturing technology in the automotive industry and precision industries.

In a Japanese paper a flexible manufacturing system using laser machining was discussed. The project is part of a 7-year program where fundamental laser technologies for blank fabrication and machining will be developed and a flexible assembly system will be built. In the 12 billion yen program 3 government institutes and 20 companies participate.

Information processing in small and large systems

There was a diversity of different projects under this category.

The Institute for Control of Machine Tools and Manufacturing Systems of the University of Stuttgart presented a multiprocessor control system for machine tools using one common bus. Individual control functions can be assigned to different processors which are connected to the bus by common hardware and software interface modules.

A group of Japanese authors discussed automatic monitoring and diagnosis systems for machine tools. These include a failure causality model method and a sequential machine model method.

An additional successful feature was a series of 3 lectures presenting in elaborated detail a case study on the supervisory control of a pulp mill (Skutskär, Sweden) by L. Eriksson and collaborators. Another case study by C. Foulard and coworkers on a paper machine multicylinder drying section aroused also much interest.

Prof. A.R. Van Cauwenberghe
Jan Van Rijswyklaan 58
B-2000 Antwerp

Materials handling within manufacturing systems

The Institute for Industrial Production and Factory Operation of the University of Stuttgart presented a paper on a pallet coding and positioning system for a palletized conveyor system using linear motors.

A summary of different recent developments in material handling systems was given by the Fraunhofer Institute for Production Technology and Automation, Stuttgart.

Control requirements for industrial robot application

A very comprehensive paper on assembly research was presented by the Draper Laboratory. The principle of force-friction relationships for insertion tasks were investigated. In order to facilitate insertion a remote center compliance tool was designed and tested. The paper also discusses the automation assembly of alternators for automobiles with the help of a robot and material handling system. Finally the results of a simulation program for a robotic assembly system was presented.

The results of a very comprehensive study on the development of robots for handling and assembly in space were discussed by the Jet Propulsion Laboratory. The systems included automatic handling equipment, teleoperators and robots under supervisory control.

The Polytechnic Institute of Electrical and Electronics Engineering of Milan presented a paper on the philosphy of robot programming.

Quality assurance in automated manufacturing

An overview on future on-line hierarchical quality control systems for manufacturing was given by the University of Karlsruhe.

The Laboratory of Machine Tools in Aachen presented a new workpiece measuring system for machine tools and the Case Western Reserve University an in-process optical gauging system for numerical machine tools.

Prof. Dr. Ing. U. Rembold
University Karlsruhe
Zirkel 2, Postfach 6380
D-75 Karlsruhe 1

FORTHCOMING EVENTS

4th INRIA/IFAC Conference on Analysis and Optimization of Systems
December 16–19, 1980, Versailles, France
Information to be obtained from

INRIA
Institute National de Recherche en Informatique et en Automatique
Domaine de Voluceau-Roquencourt
B.P. 105
F–78150 Le Chesnay
France

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Preview for the next issue November 1980

PAPERS
Assembly Research
(J.L. Nevins, D.E. Whitney)

Safeguard Design for a Plutonium Concentrator – An Applied Estimation Approach
(J.V. Candy, R.B. Rozsa)

Atmospheric Perturbation and Control of a Shuttle/Tethered Satellite
(T.M. Spencer)

Area Decompositions for Electromechanical Models of Power Systems
(B. Avramovic, P.V. Kokotovic, J.R. Winkelman, J.H. Chow)

Automation of Chemical Plant Modelling
(O. Aarna)

A Comparative Analysis of Various Least-Squares Identification Algorithms
(D. Graupe, V.K. Jain, J. Salahi)

BRIEF PAPERS
Recursing Prediction Error Algorithms without a Stability Test
(H. Weiss, J.B. Moore)

Identification by a Combined Smoothing Nonlinear Programming Algorithm
(A.E. Bryson, Jr., A.B. Cox)

Fuzzy Control of the Activated Sludge Wastewater Treatment Process
(R.M. Tong, M.B. Beck, A. Latten)

(A,B)–Invariant and Stabilizability Subspaces, A Frequency Domain Description
(M.L.J. Hautus)

TECHNICAL COMMUNIQUES
Observability in Discrete Time System with Faulty Sensor
(D.N.P. Murthy)

On Symmetric and Unity Interconnections Between Three Nonlinear Subsystems
(G.V. Baliga, M.V.C. Rao)

CORRESPONDENCE
Comments on: „Diagonal Dominance for Multivariable Nyquist Array Methods Using Function Minimization
(S.I. Ahson)

Author's Reply
(G. Leininger)

3rd IFAC Conference on System Approach for Development (Rabat, Morocco, November 24–27, 1980)

Co-sponsored by:

The International Federation of Information Processing (IFIP) and the International Federation of Operational Research Societies (IFORS)

Topics:

Modeling and identification of industrial processes, process control, economics and management systems of automatic control, new sources of energy, food and agriculture development, management of water resources, transportation, software for control and transfer of technology.

Language:

English-French translation will be provided.

For more information please write to:

Prof. Mohamed Najim
IFAC Conference
Faculté des Sciences
B.P. 1014 Rabat – Morocco

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1st IMEKO Summer School Measurement Training – The Application of Microcomputers in Measurement (Dubrovnik, Yugoslavia, 28 September – 3 October 1981)

Sponsored by:
IMEKO Technical Committee on Measurement Theory and IMEKO Technical Commitee on Developing Countries.

Organized by:
JUREMA – the Yugoslav Association of Measurement, Control and Automation.

The purpose of the Summer School is to get engineers and scientists with different basic educations acquainted with measurement and instrumentation problems in research and industry.

The Summer School will last 6 days. Every morning a tutorial will be given, followed by experiments, demonstrations, short presentations and discussions in the afternoon. The working language will be English.

Deadline for application by lecturers with a summary of the proposed topic in three copies to be sent to the JUREMA Secretariat is
10 September 1980

The deadline for the final full texts is
31 January 1981

Further details may be obtained from:

JUREMA Secretariat
41001 Zagreb
POB. 398, Yugoslavia

International Conference "Functional-Differential Systems and Related Topics (II)"

This conference, which is being organized by the Mathematical Institute of the Polish Academy of Sciences, will be held in Kozubnik, Poland, from 16 - 23 May, 1981.

The main interest of this meeting will be recent advances in the following topics:

- Differential and integral equations with transformed argument.
- Time-lag systems: control and observation problems, stability and stabilization, optimization.
- Algebraic methods.
- Applications in Engineering, Economics, etc.

The languages will be English and Russian.

The abstracts (1 - 2 pages) should be sent to the Program Committee not later than January 15, 1981. An information about the acceptance will be given before March 1, 1981. Proceedings of the conference are expected to be published in the end of 1981. Contributed papers should be delivered no later than during the conference.

For further information please contact

D. Przeworska-Rolewicz
Mathematical Institute
Polish Academy of Sciences
Sniadeckich 8,00-950 Warszawa
P.O. Box 137, Poland

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IFIP – 3rd World Conference on Computers in Education (Lausanne, Switzerland, 27-31 July 1981)

Sponsored by:
IFIP – International Federation for Information Processing.

Organized by:
Swiss Federation of Automatic Control.

This Conference will put the accent on the possibilities of informatics adapted to teaching. The meeting will bring together people concerned with the development of computers in education, with emphasis on their application and their use in primary, secondary and university education, as well as in vocational training.

This 3rd World Conference, following those in Amsterdam (1970) and Marseille (1975) has the backing of Unesco and the Intergovernmental Bureau for Informatics (IBI, Rome) which are offering to support participants from developing countries who would like to present a paper, or to take part in round-table discussions. In addition to the Congress a youth world computer programming tournament has begun and the national winners will be able to take part in the Conference.

Further information related to the Conference programme can be obtained from

Prof. Bernard Levrat - Uni II
24, rue General Dufour
CH 1211 Geneve 4, Switzerland

AFCET, the French NMO of IFAC

We continue to introduce IFAC organisations with a report on the French National Member Organisation, AFCET.

The main originality of this NMO lies in the fact that it was established (in 1968) by merging three scientific societies working in very close, but also different areas: In automatic control (AFRA, the first French NMO), in information processing and operational research (AFIRO) and in components (AFIC).

The merger was preceded by several discussions and it was necessary to overcome strong reserves.

The agreement finally reached is apparent to the public in the name of the new organisation 'ASSOCIATION FRANÇAISE PUOR LA CYBERNETIQUE ECONOMIQUE ET TECHNIQUE' which by using the word 'cybernetics' expresses the common aspect of the previous activities, and in the chairmanship rotating between the representatives of the former three organisations for a period of two years each.

The merger has also created financial problems, since many people were members of more than one association, to cover all fields of their activities. Now they have only to be member of AFCET to get the same result. At the same time AFCET has become the French member of 5 international Federations: IFAC, IFIP, IFORS, IMEKO and IMACS. The annual fees are a heavy burden, amounting to about 8000 U.S.$ for 1980, as of course, none of the federations agrees to offer a discount!

These difficulties were quickly overcome and AFCET has been working for several years at cruising speed. The Association is structured into three great divisions: automatic control and components, theory and technics of information processing, management and economic systems. It comprises also three smaller units called "Colleges": applied mathematics, office of the future and systems analysis. The representatives of these divisions and colleges participate every month in the meetings of the board of AFCET. On the other hand, the scientific and technical activities are accomplished in about 80 working groups which, in order to maintain a manageable size, comprise a maximum of 10 to 30 members. The indicated number is relative to the year 1980. It is variable because the working groups are structures which can be created or dissolved easily.

AFCET has a number of different publications. First, it publishes an internal liaison bulletin of about 12 pages each month. 3200 copies of this bulletin are printed. Then, it participates in the editing and writing of 4 technical monthly reviews with a wide circulation among the general public: AUTOMATISME, MESURES ET CONTROLE INDUSTRIEL, INFORMATIQUE ET GESTION and INFORMATIQUE. Finally it owns, in proper, a scientific review of high level, the RAIRO Review which includes 5 series covering the fields of: systems analysis and control, operational research, numerical analysis, theoretical information processing and computer science. Each series forms the subject of a publication about every 3 months. Circulation is about 2250 copies, about 700 of them bering bought by foreign institutions.

In the field of events, AFCET organizes 2 national congresses and about 15 national symposia per year. The congresses, which last generally 4 to 5 days, concern the activities of each of the divisions of AFCET. They are attended by 300 to 700 participants. The symposia are, as for IFAC, devoted to a precise topic, which is thoroughly discussed during 2 to 4 days. The attendance is from 80 to 120, according to the subject. The proceedings of the most important events are published by AFCET.

AFCET organizes also, in France, international events for the Federations of which it is member. For IFAC, we mention the 5th World Congress in Paris in 1972 (attendance 1300) and also several symposia and workshops in different fields: application of computers, transportation systems, large scale systems... For IMEKO, AFCET has organized the World Congress IMEKO 5 in Paris (1970). For IFIP, different symposia and world conferences have been organized, and AFECT is responsible for the organization of the next world congress in September 1983. The proceedings of the international events are published according to the own rules of each Federation.

In summary, we can say that AFCET, in spite of some difficulties mentioned above, has succeeded in its mission of coordination and played its part as welcoming structure for the systematic bringing together of scientists and technicians working in related fields. Indeed, it happens from time to time that some members are moved by "centrifugal" trends. But is it possible differently in such an individualistic country where, as a proverb says (surely a foreign proverb), if you join together two inhabitants, you will have... four different opinions! Anyhow, these trends are generally weak and AFCET, by its activities and by the satisfaction it gives to its members, seems at present, after 12 years of life, a balance that we can qualify as globally positive.

R. Chaussard
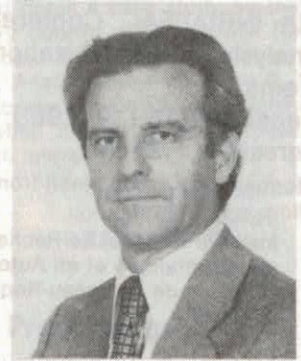
Prof. dr. ir. Pieter Eykhoff
Member, IFAC Executive Council

Pieter Eykhoff was born on April 9, 1929. He ist married and has two sons. He studied at the Delft University of Technology, where he acquired, with distinction, a M.Sc. degree in Electrical Engineering (1956). In January 1961 he obtained a Ph.D. degree at the University of California, Berkeley, U.S.A.

Upon an invitation by the National Academy of Sciences, he stayed at the University of California as a Visiting Research Fellow from 1958 until 1960.

In June 1964 he was appointed professor in the Department of Electrical Engineering of the Eindhoven University of Technology, in charge of Measurement and Control Engineering. His research interest is focused on Identification and System Parameter Estimation with applications a.o. in the bio-medical area. As a result of these activities, a book was published entitled "System Identification, Parameter and State Estimation", Wiley 1974, with a Russian and Rumanian translation as well as a Chinese and a Polish translation pending. He was a Visiting Professor at the University of Waterloo, Ontario, Canada (1968) and at Kyoto University (1974). He lectured in many countries including U.S.A., Canada, USSR, Japan, People's Republic of China. From 1977/1980 he was Dean of the Department of Electrical Engineering. He is a Fellow of the IEEE and has been a board member of the Dutch NMO, of the Foundation for Post-Degree Education in Control Engineering and is to be found on the Editorial Board of several international journals.

Prof. Eykhoff was Honorary Editor of IFAC (1972–1975). He has been a member of the Executive Council since 1975 and a member of the IFAC Publications Managing Board since 1976. He has taken the initiative and has been instrumental in establishing the IFAC one-publisher scheme which is in full operation now. He also (co)authored several IFAC brochures and edited the anniversary publication "IFAC 20 years old, 20 years young" (1977). He was Chairman of the International Programme Committee and National Organising Committee of the 1973 IFAC Symposium on Identification and System Parameter Estimation, the Hague, as well as Editor of the Proceedings of that Symposium. He is also Editor of a new book "Trends and Progress in System Identification" written by well-known IFAC experts; this book is the first in a new IFAC series for graduates, research workers and practising engineers and will appear later in 1980 at Pergamon Press.