IFAC International Federation of Automatic Control

1986 No. 2 April Newsletter

Contents:

A Great Loss

The International Federation of Automatic Control has lost one of the main contributors to IFAC history. Fred Margulies, our former Honorary Secretary and Newsletter editor died suddenly and unexpectedly from a heart attack on February 10, 1986.

Fred Margulies was a devoted member of the IFAC family, active in the Federation since 1963 when he initiated the foundation of the Social Effects Committee. He was the second chairman of this Committee from 1975 to 1978 and his message to the automation community and mankind at large was that man is superior over the machine and that progress in technology must be harmonized with the progress in humanities.

Fred Margulies' personal qualities and reputation in Austria, which was based on a creative professional life, helped us establish the first permanent seat of IFAC in Laxenburg, Austria, which was a major achievement in stabilizing our Federation both financially and by an independent administration.

Beyond his engineering career Fred Margulies played a leading role in the Austrian Trade Union, strengthening the social position of the engineers in the new social environment. He led and stimulated several research projects, aiming at more user-friendly, human-oriented, physically and psycho-logically healthier conditions in conjunction with the introduction of modern automation and computer systems.

The IFAC family will always remember Fred Margulies for his personality and the services he rendered to our Federation and thus also to the community.

Dear Professor Margulies,

You always were a wonderful and prolific letter-writer and this is why I have chosen this way to say good-bye to you.

I had the privilege to work for and with you for almost 7 years and I still remember our very first meeting in London at an IFIP conference. After having talked to me about 20 minutes you asked me if I didn't feel like starting to work again. You really took me by surprise then and it was thus that we both started the editing of the Newsletter together.

This was new and very exciting for me — your standards were very high but you did never spare yourself either. The layout and new good looks of the Newsletter were based mainly on your ideas.

I really admired your versatility and your readiness to start new projects, a quality I even got to know much better when you left IFAC and asked me to join you in your work at the Technical University of Vienna. There I witnessed the activities of the assiduous worker for automation-causes who never asked what his personal gain would be but was solely concerned with how to benefit the community. This has become so rare nowadays that I do think it should be mentioned here.

Thank you for all the inspiration and guidance you have given us

Yours
Margaret A. Gottfried

Model Error Concepts and Compensation
IFAC Workshop
Boston, Mass. USA, June 17—18, 1985

The Workshop was dedicated to clarifying concepts of model errors, their characterization, and their compensation in estimation and control problems. A fundamental agreement from the Workshop is captured in this deceptively simple phrase — *The modelling problem and the control design problem are not independent!* The phrase is deceptively simple in the sense that its acceptance leads into a minefield of conceptual, technical and computational problems which are only just being recognized by the control community. The phrase also contains the elements of controversy as it implicitly asserts that the system modeller cannot "sensibly" proceed in a systematic and scientific way to produce a model for the purpose of controller design without taking direct account of the control scheme to be designed.

The Workshop was cosponsored by the ACC and IEEE Control Systems Society. The International Program Committee was chaired by D. H. Owens from the University of Strathclyde, Scotland.

The plenary sessions featured Dr.-Ing. J. Ackermann talking on "Multimodel Approaches to Robust Control System Design" and Prof. B. D. O. Anderson talking on "Low Order Controller design for High Order Plants: A Survey".

The Workshop Proceedings are available from Pergamon Press Ltd., Headington Hill Hall, Oxford OX3OBW England for $ 50 US.

R. E. Skelton and D. H. Owens
Chairmen NOC

Digital Computer Applications to Process Control
7th IFAC/IFIP/IMACS Conference
Vienna, Austria, September 17–20, 1985

The topic of the Conference was automatic control engineering applications and related aspects with computers of various performance. The Conference was attended by 150 participants from 18 different countries and it treated 6 survey papers, 3 tutorials and 102 technical papers. Only 85 papers could, however, be presented by the authors themselves or by substitutes.

At the tutorials and survey paper presentations, a state of the art and directions of future developments of digital control and related topics were given by experts. Special technical issues were presented and discussed in 8 application sessions and 9 sessions with more or less theoretically oriented papers. Main topics of the former group were among others from chemical and oil industries (2 sessions) and from energy and power systems (2 sessions). These two applications are nearly "classic" for digital control. However, only few papers were describing "advanced" control algorithms. Most of the theoretical papers dealt with adaptive control (2 sessions) and with modelling and identification (2 sessions). Many papers in these sessions gave the impression of methods being applicable but rarely used in practice.

The distribution of control functions results in a high demand for reliable data networks. In a session on distributed systems and data networks the papers presented, therefore, described the problems as well as the solutions for real time requirements using data networks in control engineering. Applying computers also means to have powerful tools to develop, edit, compile and test programmes for real time purposes. The corresponding session on real time software and languages showed concepts and especially CAD-methods to tackle the demands in this area.

As in previous conferences we still missed papers dealing with proper applications of adaptive and other advanced control algorithms in the industrial field, all the more as it is rather easily possible now to implement such algorithms with computers even of the size of personal ones.

Many authors made the audience realize the great reliability of computer control and the broad confidence in tackling difficult matters with it. The important role of programme portability was pointed out by many speakers several times.

The scientific programme was complemented by 8 technical visits to control computer installations in various firms in and around Vienna (oil refinery, sewage works, Austrian Civil Aviation Authority, Vienna Underground Control Center and a manufacturer of robots) as well as to institutes of the Technical University of Vienna and by a social programme.

The attendance of the Conference and the lively response the Conference met in the audience justified holding the 7th Conference on Digital Computer Applications to Process Control although the topic is nearly a quarter of a century old and has recurred many times. The number of participants showed that such general conferences still hold a strong attraction to many control engineers and should not simply be split up into a variety of smaller specialist's symposia or workshops. In the opinion of most of the participants this series should be continued in the future.

P. Kopacek
Chairman NOC

Safety of Computer Control Systems – SAFECOMP '85
4th International Workshop
Villa Olmo — Como, Italy, October 1-3, 1985

The workshop was sponsored by IFAC and organized, on behalf of the Italian NMO of IFAC, by the Associazione Nazionale Italiana per l'Automazione (ANIPLA) in association with the European Workshop on Industrial Computer Systems, the Comitato Nazionale per la Ricerca e per lo Sviluppo dell'Energia Nucleare e delle Energie Alternative (ENEA), the Raggruppamento Ansaldo S.p.a. and the Centro Studi ed Applicazioni in Tecnologie Avanzate (CSATA).

The call for papers drew 50 submissions from which 30 were chosen for presentation at the workshop.

Registration for attendance was considerably above that expected. The 102 participants came from 19 different countries.

Papers were made available to participants as a bound volume published by Pergamon, which is now available as one of their titles in the IFAC proceedings series ("Safety of Computer Control Systems 1985", editor W. I. Quirk).

Some themes and impressions from the workshop were:

— The growing interest in software diversity with results from different experiments in Europe and the USA. No consensus on the benefits of diversity against correlated faults exists at present.

There is no information available on whether it would not be better to produce one version and spend the same amount of resources on other reliability enhancing procedures such as sophisticated verification and validation procedures or sophisticated program development environments and techniques.

— A wide variety of distributed system design techniques including multiple systems with voting, systems with self-check and error recovery. A strong interest in those papers which gave details of system architecture and inter-processor communication.

— Confirmation on difficulties in the statistics and predictive modelling of reliability of software, which may still cause licensing problems when ultra-reliability is denounced.

— The growing interest for the man-machine interface and the applications of artificial intelligence and expert systems technology in the computer assisted decision-making process.

— Diminishing emphasis on the use of formal specification language and growing interest in configuration management techniques.

— A constant interest in the verification and validation and documentation techniques.

In addition to the main session, a panel session on Software Design for Reliability and Safety was held. The next SAFECOMP will be held in Sarlat, France, from October 15th to 18th 1986.

Dr. E. De Agostino
IPC Chairman

Systems Analysis Applied to Water and Related Land Resources
IFAC Conference

Lisbon, Portugal, October 2—4, 1985

The IFAC Conference on Systems Analysis Applied to Water and Related Land Resources took place at the new Conference Center of LNETI. About 70 abstracts were received and over 40 papers were accepted and included in the volume of preprints distributed to all participants at the beginning of the Conference. More than one hundred colleagues have actively participated, presenting and discussing papers and lectures. They came from 27 countries.

The whole work of this Conference was based on an interdisciplinary attitude towards the objective of improving the control and management of natural resources. This implies bridging the gap between two rather different disciplines (the field of Natural Resources and the field of Systems Control) as well as the gap between quite different experiences: those of highly industrialized countries and the problems of developing nations. Therefore, right from the beginning, a strong effort was made to bring along representatives from these different backgrounds. The success achieved was largely

due not only to the help received from IFAC but also to the support and/or active participation of several international institutions, such as IFORS, the Intergovernmental Bureau for Informatics (IBI) cosponsoring this event as well as IIASA, the International Institute of Sahel, the International Institute of Systems Engineering and Development (IISED), the Center for Integrative Studies and Applications in Advanced Technologies (CSATA), Gulbenkian Foundation, etc. The participants decided to start an international and informal study group on „Systems Analysis on Natural Resources in Developing Countries" to exchange results and experiences.

The President of IFAC opened the meeting, which was the first IFAC conference organized in Portugal.

L. Valadares Tavares
Chairman IPC

and

J. Evaristo da Silva
Chairman NOC

New Publications

Automation for Mineral Resource Development
Proceedings of the 1st IFAC Symposium, Brisbane, Australia, 9—11 July 1985
Editors: A. W. Norrie, D. R. Turner
Julius Kruttschnitt Mineral Research Centre, Indooropilly, Australia

This publication reviews the role of advanced automation technology in the development of mineral resources, with particular emphasis on mining and mineral processing. The 53 papers cover automation and the future of mining, modelling and control of mining processes, transportation in mining and modelling, control, automation and the future of metallurgical processes. As established mineral deposits become depleted and new techniques are being sought to overcome the problems encountered in winning minerals from less accessible deposits, the topics discussed in this volume will take on increasing significance in the mining and mineral processing industry.

pp. 370   US $ 74.00

Available from:

Pergamon Press Ltd,
Headington Hill Hall,
Oxford OX3 0BW, UK

Real-Time Programming
13th IFAC-IFIP Workshop

West Lafayette, Indiana, USA
October 7-8, 1985

The Thirteenth IFAC-IFIP Workshop on Real-Time Programming was held at Stewart Center, Purdue University in conjunction with the 1985 Annual Meeting of the International Purdue Workshop on Industrial Computer Systems (also coincidentally the thirteenth).

In contrast to most previous Real-Time Workshops, the program for this meeting was planned by the International Program Committee to include sessions on programming for statistical quality control, on the use of graphical languages for real-time programming, and on programming of personal computers and work stations for real-time applications. These were organized respectively by Mr. Edgar J. Harter, Dr. James H. Christensen and Mr. Edgar H. Bristol. A general papers session was also included for those papers resulting from the general call for papers.

17 papers were accepted and presented from the total of 24 abstracts submitted. No plenary papers were presented. A total of 64 attendees participated in the Workshop compared to the planned 50.

A preprints was prepared for the Workshop. All 17 papers will be included in the Workshop Proceedings to be published by Pergamon Press.

The 14th IFAC-IFIP Workshop on Real-Time Programming will be held at Siófok on Lake Balaton, Hungary, on May 26-28, 1986.

Theodore J. Williams
General Chairman

Adaptive Control of Chemical Processes
1st IFAC Workshop

Frankfurt/Main, FRG, October 21-22, 1985

The aim of this workshop was to present and to discuss recent experiences and advances in the application of adaptive control to chemical and related processes.

It was the first workshop on this special area of adaptive control, and benefited from the sponsorship of the IFAC Technical Committees on Applications and on Theory, as well as of the European Federation of Chemical Engineering. About 130 people from 12 countries attended this meeting, 60% of them came from the industrial field.

A great number of papers treated practical applications of adaptive and self tuning control, especially linear and non-linear control schemes for distillation columns, stirred tanks, and several types of chemical reactors were given. Experimental results for pilot and production plants were presented. It was pointed out that adaptive control gives better system performance, allows shortening of start-up and control optimization time and leads in nearly all cases to saving of energy compared to conventional control. The tuning of simple three-term-controllers and the adaptation of varying time delays was also considered in several papers.

The scientific program was arranged by an International Program Committee chaired by H. Unbehauen (FRG).

Pergamon Press is planning to publish the Workshop Proceedings.

Case Studies in Automatic Control for the IFAC Congress in Munich

July 26-31, 1987

In addition to plenary lectures, technical sessions with survey and regular papers and discussion sessions, Case Study Sessions in Automatic Control are planned during the congress week. A case study is defined as "an in-depth treatment of an automatic control problem including applications and experimental results". Double length papers (12 pages A3) will be provided with 40 minutes presentation time. The case studies are solicited in all fields of automatic control, especially within the subject areas given in the Call for Papers brochure.

Experts from industry or research institutions are invited to submit proposals for case studies.

Deadlines: May 24, '86
            Deadline for sending a detailed
            abstract (2 pages)

            November 1, '86
            Information to the authors about
            acceptance

            February 15, '87
            Final paper

Further details are given in the Call for Papers. — Please send your proposal to

IFAC Congress Secretariat '87
VDI/VDE Gesellschaft
Meß- und Regelungstechnik
(GMR)
P.O. Box 1139
D-4000 Düsseldorf 1, FRG

News from NMOs
INDIA

The objects and purpose of the Institution of Engineers (founded in 1920) are to promote and advance the science and practice of engineering in all its branches and to facilitate the exchange of information and ideas.

Membership (as on 30.9.1985):

Fellows	6 571
Members	27 849
Associate Members	18 279
Affiliate Members	48
Senior Technicians & Technicians	124 648
Donor Members	90
Beneficiary Members	10
Students	49 273
Total	**226 768**

Corporate membership includes the grades of Fellow, Member and Associate Member.

Apart from the various activities organized and conducted by the standing committees of the Council and the Division Boards, the Institution is the national committee or member of several international bodies such as the World Energy Conference (WEC), World Federation of Engineering Organisations (WFEO), International Federation of Prestressed Concrete (FIP), International Federation of Automatic Control (IFAC), International Institution of Production Engineering Research (CIRP), World Mining Congress (WMC), etc. The Institution has successfully organized the 12th Congress of the World Energy Conference in New Delhi in September 1983, the 12th World Mining Congress in New Delhi in November 1984 and the Second World Congress on Engineering and Environment in New Delhi in November 1985 as well as the 10th International Congress of FIP in New Delhi in February 1986.

The Institution also runs an Engineering Staff College, whose main aim has been to impart education to engineers and those interested and qualified technically as a life-long process, as a vital professional necessity. What distinguishes this College from others, which focus on formal education through set programmes, is its emphasis on and dedication to imparting profession-oriented, engineering re-education not in a set way but through a versatile, viable and moving process which calls for an intimate involvement in short sessional studies and actual personal experience from every participant.

Kyoto Prize

Professor R. E. Kalman, the pioneer of modern control and system theory, was awarded the Kyoto Prize last November. The Kyoto Prize was established as an equivalent of the Nobel Prize with a special emphasis on basic and advanced technology. The amount of 45 million yen (approximately US$ 225.000.—) given to each recipient is just below that of the Nobel Prize.

Apart from Professor R. E. Kalman, Claude Shannon, the founder of information theory and Olivier Messiaen, one of the greatest composers of our time were awarded this new prize for science, technology and intellectual-spiritual development.

Note:
Change of Location

The 1986 IFAC Symposium on Control of Distributed Parameter Systems from June 30 to July 3, 1986 has been shifted from Pasadena, California to the University of California at Los Angeles, L.A., California

WHO IS WHO IN IFAC
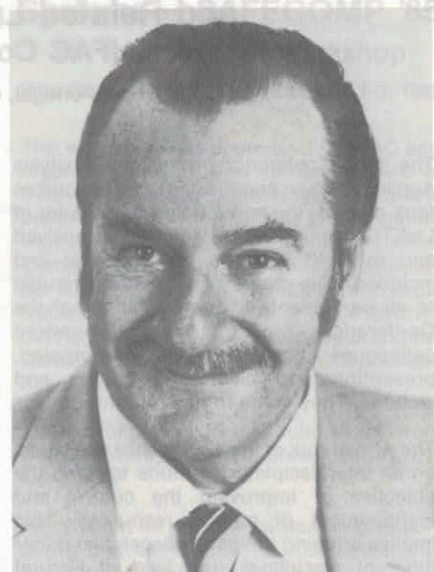
Jan Daniel Naudé van Wyk
Vice-Chairman of the Technical Board

Mr. Jan Daniel Naudé van Wyk was born on 10 March 1927, in Lady Grey, South Africa. He studied at the University of Cape Town, where he obtained the B.Sc. (Electrical Engineering) degree with distinction in 1949. Soon after, he joined the Council for Scientific and Industrial Research (CSIR), where he is currently Chief Director of the National Electrical Engineering Research Institute (NEERI).

He was awarded the UNESCO scholarship for post-graduate studies overseas, and spent the year 1953 at the Chalmers Institute of Technology in Göteborg, Sweden, where he worked under Prof. Henry Wallman on analog computers. On his return home, he developed an analog computer known as the HEIDEN, which was in use at the CSIR until 1968.

In 1957 Mr. van Wyk was leader of a team visiting Europe to study the application of digital computers in scientific research and to select a suitable computer for use at the CSIR. This was the first general-purpose digital computer used in scientific research in his country.

Over the years Mr. van Wyk has initiated the CSIR's central activities in electrical engineering and, as Chief Director of NEERI, he strives in particular for close co-operation with industry in the specialist fields of power systems, microelectronics, industrial technology and digital systems, which comprise the research programme of his Institute.

Mr. van Wyk has authored or co-authored more than 30 scientific papers for national and international journals and conferences.

Mr. van Wyk has recently been awarded an honorary doctorate in engineering by the Rand Afrikaans University, in recognition of the leading role he has played in establishing electrical engineering as a technical science.

Mr. van Wyk is a member of various professional societies and committees. He has been actively involved in IFAC for many years, inter alia as Chairman of the Technical Committee on Computers (1975–1978), as a member of the Policy Committee (1981–1984), and currently as Vice-Chairman of the Technical Board.