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Newsletter

Symposium Report

Theory and Application of Digital Control

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This Newsletter may be reproduced in whole or in part. We encourage reprinting in national and local automatic control periodicals. Acknowledgement to IFAC would be appreciated.

The symposium was held in New Delhi during January 5—7, 1982, with nearly 300 participants of whom 200 were from India and the balance came from 14 other countries including USA, Canada, U.K., France, West Germany, Japan and Australia. The program contained:

- 5 plenary lectures
- 5 state of art papers and
- 151 papers selected out of 234 abstracts submitted for consideration.

The plenary lectures were:

1. The Software Age by W. F. Miller
2. Fuzzy Probabilities and Their Roles in Decision Analysis by L. A. Zadeh (presented by M. M. Gupta)
3. Large Scale Control System Design by E. J. Davison
4. Microprocessors in Real Time Control by D. W. Clarke
5. Real Time Processing of Statistical Signals by T. Kailath

The state of art papers included:

- Status of Digital Control Systems by H. Unbehauen
- Theoretical Developments in Discrete Time Control by P. Dorato
- Digital Processing of Biological Signals by R. E. Bogner
- Model Correcting Attitude and Position Estimation Filters by R. P. Offereins and M. J. L. Tiernego
- Model Simplification — an Overview by S. S. Lamba and M. S. Mahmoud

The presented papers covered the following broad areas:

DIGITAL CONTROL: The largest group of papers was concerned with various aspects of digital control which included modelling of digital control systems, optimal control, implementation of digital control schemes using microprocessors, computer aided design, digital adaptive control and some new fields of application of digital control.

DIGITAL SIGNAL PROCESSING: There were several papers concerned with clustering and image processing techniques, new methods for spectral and seismic reflection coefficient estimation, multi rate digital filters, and nonlinear state estimation.

SYSTEM IDENTIFICATION: The papers in this group dealt with the questions of order testing of canonical models of multivariable systems and new algorithms for recursive identification of linear, bilinear and nonlinear systems.

LARGE SCALE SYSTEMS: The main topics included model order reduction techniques, application of reduced order models in controller design and decentralized control.

FUZZY SYSTEMS: The papers in this group covered a variety of topics, e.g., analysis of dynamic systems in fuzzy environment, fuzzy tools for modelling and control, identification of systems under fuzzy environment and application of fuzzy decision techniques in medical diagnosis and in recognition of hand written characters.

SOCIOECONOMIC SYSTEMS: A number of papers discussed application of digital techniques in problems of modelling and control of socioeconomic systems. Of particular interest were papers dealing with a case study of lake ecosystem modelling in Egypt, analysis of social preferences in Japan and recent experiences in Canada with large scale urban development models.

POWER SYSTEMS: This was another important application area covered by a number of papers. The main topics included optimization of the transmission capacity of a power network with application to the French network, improved digital load flow analysis for on-line security assessment, discrete time control of systems with generation rate constraints, optimal and secure short term commitment of thermal units and hierarchical LFC of a 2-area system.

OTHER APPLICATIONS: These included application of microprocessors for optimal and sub-optimal attitude control of satellites, digital attitude control with automatic reconfiguration and remote programmability, use of multivariate time series for estimation of orbital states, digital processing of heart sounds, partitioning of compartmental models of biological systems, automated classification of liver dysfunction and adaptive pattern recognition for medical diagnosis.

The symposium proved highly successful for all the participants who benefited through the formal presentations and also through many formal and informal discussions.

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A. K. Mahalanabis

FORTHCOMING EVENTS

Title	Date 1982	Place	Deadlines	Further Information
IFAC Workshop on Modeling and Control of Biotechnical Processes	August 17—19	Helsinki, Finland	— Papers: August 17	Prof. J. Virkkunen Control Engineering Lab. Helsinki University of Technology SF 02150 Espoo 15
IFAC Workshop on Management Control Systems — Modeling of Dynamics	September 6—10	Dubrovnik, Yugoslavia	—	Faculty of organizational sciences IFAC Workshop Ul. Oslobodjenja 1, 11090 Beograd, Yugoslavia
IFAC Symposium on Computer Aided Design of Multivariable Technological Systems	September 15—17	W. Lafayette, Ind., USA	—	Prof. G. Leininger Purdue University IFAC/CAD, School of Mechanical Engineering West Lafayette, Ind. 47907, USA
IFIP/IFAC Int. Symposium on Ship Operation Automation (ISSOA '82)	September 20—22	Genoa, Italy	—	Istituto Internazionale delle Comunicazioni Via Pertinace — Villa Piaggio I-16125 Genoa, Italy
IFAC/IFIP/IFORS/IEA Conference on Analysis, Design and Evaluation of Man-Machine Systems	September 27—29	Baden-Baden, FRG	—	VDI/VDE Gesellschaft Meß- und Regelungstechnik Postfach 1139, D-4000 Düsseldorf 1, FRG
ÖGI/IFAC Conference Industrial Robots: Chances and Problems for our Enterprises	September 28—30	Linz, Austria	—	Prof. Dr. Arno Schulz Institut für Informatik Johannes Kepler Universität A-4040 Linz, Austria
3rd IFAC/IFIP Symposium on Software for Computer Control (SOCOCO '82)	October 5—8	Madrid, Spain	—	SOCOCO '82 E.T.S. Ingenieros Industriales, Castellana 84, Madrid 6, Spain
IFAC Workshop on Safety of Computer Control (SAFECOMP '82)	October 11—14	W. Lafayette, Ind., USA	—	Mr. Roy W. Yunker PPG Industries Corp. One Gateway Center Pittsburgh, PA, 15222, USA
4th IFAC/IFIP Symposium on Information Control Problems in Manufacturing Technology	October 26—28	Gaithersburg, Maryland, USA	—	M. Auman, Secretary IVth IFAC/IFIP Symposium, National Bureau of Standards Building 220, Room A 123 Washington DC 20234, USA
IFAC Symposium on Components and Instruments for Distributed Control Systems	December 9—11	Paris, France	—	Dr. Z. Binder Laboratoire d'Automatique de Grenoble — ENSIEG, B. P. 46, F-38402 St. Martin-d'Hères, France
INRIA/IFAC 5th International Conference on Analysis and Optimization of Systems	December 14—17	Sophia Antipolis, France	—	INRIA — Service des Relations Extérieures, Domaine de Voluceau, Rocquencourt B. P. 105, F-78153 Le Chesnay (France)
Title	1983	Place	Deadlines	Further Information
IFAC/IFIP Symposium on Real Time Digital Control Applications	January 15—21	Guadalajara City, Mexico	—	Dr. Roberto Canales Ruiz, Chairman of IPC Dept. of Automation, Instituto de Ingenieria, UNAM Apdo Postal 70-472 Delegacion Coyoacan 04510 Mexico, D.F.
IFAC Symposium on Systems Approach to Appropriate Technology Transfer	March 22—24	Laxenburg, Austria	—	IFAC — Symposium "Appropriate Technology Transfer" Ö P W Z, Rengasse 5 1014 Vienna, Austria
4th IFAC/IFIP/IFORS Int. Conference on Control in Transportation Systems	April 20—22	Baden-Baden, FRG	—	VDI/VDE Gesellschaft Meß- und Regelungstechnik Postfach 1139, D-4000 Düsseldorf 1, FRG
IMACS/IFAC Int'l Symposium Simulation in Engineering Sciences	May 9—11	Nantes, France	—	A.F.C.E.T. IMACS Symposium 1983 156, Bd. Péreire 75017 Paris, France
5th IFAC Workshop Distributed Computer Control Systems	May 18—20	Johannesburg, South Africa	not yet known	Prof. M. G. Rodd University of the Witwatersrand 1 Jan Smuts Avenue, Johannesburg, South Africa

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FORTHCOMING EVENTS (ctd.)

Title	Date 1983	Place	Deadlines	Further Information
IFAC/IFIP Conference Training for Tomorrow: Educational Aspects of Computerized Automation	June 7—10	Leiden, NL	Abstracts: October 1, 1982	Mr. L. Immink c/o Twente University of Technology Dept. C.T., P. O. Box 217 NL-7500 AE Enschede, The Netherlands
4th IFAC/IFORS Conference The Modelling and Control of National Economies	June 17—19	Washington D.C., USA	—	Dr. M. Canzoneri 4th IFAC/IFORS Conf. Board of Governors, Federal Reserve Washington DC 20551, USA
IFAC Workshop Applications of Nonlinear Programming to Optimization and Control	June 20—21	San Francisco, USA	Abstracts: Feb. 1, 1983 (6 copies)	Prof. H. E. Rauch Lockheed 52-56/205 3251 Hanover Street Palo Alto CA 94304, USA
3rd IFAC/IFORS Symposium Large Scale Systems: Theory and Applications	July 11—15	Warsaw, Poland	—	Dr. Z. Nahorski 3rd IFAC/IFORS LSSTA Systems Research Institute Polish Academy of Sciences ul. Newelska 6, 01-447 Warsaw, Poland
IFAC/IFIP/IFORS Symposium Fuzzy Information, Knowledge Representation and Decision	July 19—21	Marseille, France	not yet known	Prof. M. Roux Laboratoire de Biomathématique Faculté de Médecine 27, Blvd. Jeon-Moulin F-13385 Marseille, Cedex 5, France
4th IFAC Symposium Mining, Mineral and Metal Processing	August 22—25	Helsinki, SF	Abstracts: Sept. 10	IFAC 4th MMM Symposium 1983 Secretariat P. O. Box 192 SF-101 Helsinki 10, Finland
IFAC Workshop Simulation and Validation Techniques to establish Control System Performance	August 22—26	Stanford, Univ., USA	not yet known	Prof. D. B. DeBra Dept. Aero & Astro Stanford University Stanford CA 94305, USA

IFAC Presidents met in Laxenburg and Budapest

At the end of March, Prof. Sawaragi, the immediate past president of IFAC, visited Laxenburg for some business with IIASA. President Vamos took the opportunity to meet with him and with M. Thoma, B. Tamm, H. Akashi and F. Margulies, on the premises of the IFAC Secretariat. W. E. Miller, who had also intended to join the group, unfortunately, had to cancel his visit.

Like in previous years the meeting was of informal character. No decisions were taken and all deliberations were communicated to Council members for discussion at the next meeting of the Council.



Topics discussed included the forthcoming Anniversary Day and the Council Meeting in Heidelberg, current information on NMOs and TC activities, publication matters, financial problems, liaison with international organizations, and the ongoing preparations of the 1984 World Congress in Budapest.

This latter issue was dealt with in more detail when the group proceeded to Budapest, spoke with the organizers on the spot and took a closer look at the premises where congress events are to take place.

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Contribution of IFAC to the Transfer of Automatic Control and Systems Engineering Technology

WHO IS WHO IN IFAC

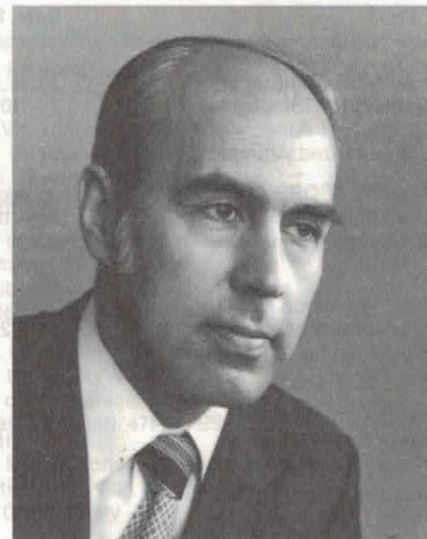
A proposal drafted on behalf of EDCOM and DECOM by M. Cuénod and M. Schaufelberger

The purpose of IFAC, as laid down in the Constitution, is "to promote the science and technology of control in the broadest sense in both theory and application". This should imply the exchange and circulation not only of information and knowledge but also of scientists or engineers on a worldwide scale.

The two IFAC Technical Committees primarily involved in realizing such aims, the TC on Education (EDCOM) and the TC on Developing Countries (DECOM) have discussed these issues and have approved the following proposal. It identifies some practical ways to enhance such exchange of persons, equipment and publications between the teaching and research institutions of industrialized and developing countries, where IFAC NMOs exist.

c) Exchange of equipments

The availability of equipment requested for training and for "hands-on" experiences, like microcomputers, microprocessors, minicomputers, interfacing and peripheral equipments, is also one of the basic needs of institutions in developing countries involved in teaching of automatic control. Often such equipments used in universities of industrialized countries must be replaced by more modern ones but could still be used. Instead of throwing them away, they could be put at the disposal of teaching institutions in developing countries. On the other hand, some suppliers of these equipments could agree to provide them to these institutions within the frame of their publicity policy.



Professor Antti Johannes Niemi
IFAC Council Member

Professor Antti Johannes Niemi was born on September 15, 1928 in Tampere, Finland. He took his engineering degrees in 1954 and 1964, and his Dr. Techn. in 1966. Following graduation, he worked in Finnish industries for instrument systems and automatic control on metallurgical and other processes.

The scientific studies of Prof. Niemi were mainly directed to dynamics and control of continuous flow processes. More lately, he has studied control methods in the manufacturing industry, specializing in providing the standard industrial robot with a visual sensory function and in automatic scene analysis by a real-time computer.

Since 1969, he is Professor of control engineering at Helsinki University of Technology where he has also served as Head of Department.

Together with his colleagues, he has run interdisciplinary studies on automation in specific industries and on its effects on the workers and on the working environment.

Prof. Niemi temporarily worked as consultant to the International Atomic Energy Agency and to industrial companies and has received several patents.

At present — having been granted leave of absence from his university — he works as research professor at the Technical Research Centre of Finland. He is Chairman of the Society Commission of FEANI, the European Federation of National Associations of Engineers.

For many years, Antti Niemi has been serving IFAC in various important offices. He was the Secretary of the Applications Committee 1966 — 69, Vice-Chairman of the Policy Committee 1972 — 75, Chairman of the Policy Committee 1975 — 78, and Chairman of the Advisory Committee 1978 — 81. He had a great share in the 7th IFAC World Congress in Helsinki 1978 as Chairman of the International Program Committee and Editor of the Proceedings. The General Assembly meeting in Kyoto, August 1981, elected him IFAC Council Member. He is also a Member of the Automatica Editorial Board.

a) Exchange of visiting professors and researchers

Many universities and research centers in developing countries are in need of professors and researchers with a background of practical experience in their fields. On the other hand, professors on sabbatical leave or retired engineers may be capable to meet these requirements and would be ready to serve for limited periods in developing countries, to share their experiences and know-how.

Under the sponsorship of the IFAC TC on Education (EDCOM) two lists should be established:

- A list of professors or researchers on sabbatical leave from developed and developing countries, willing to serve abroad as visiting professors or researchers.
- A list of universities or research institutes from these two categories of countries interested and willing to welcome visiting professors for periods of three months up to one year.

b) Teach the teachers

To support and to stimulate the faculty members teaching automatic control science and technology in developing countries a task force of 2 to 3 professors should be established with a well prepared program to give intensive courses of 3 to 4 weeks duration in fields closely related to the needs of the relevant developing countries. To facilitate the attendance such courses should be organized during the recess between the trimesters or semesters of the faculties concerned.

The organization of such intensive courses involves expenses which can probably be covered only with the support of governmental organizations like UNESCO and could be the occasion of a fruitful collaboration between IFAC and these organizations.

d) Exchange of publications

The availability of books, proceedings, and other kinds of publication, is also one of the main needs of educational institutions in developing countries. Due to their high prices, it is often difficult for these countries, and most often impossible due to the shortage of foreign currencies, to afford them.

Retired professors or institutions having books, text books, dissertations, proceedings which they could dispose of could make them available to institutions in developing countries.

This proposal does not suggest to create within IFAC a clearing office of scientists, equipments or publications, which would be beyond the possibility of IFAC, but to act as a catalyst promoting a direct contact between providers and receivers of experts, equipments and publications in the field of automatic control.

The authors will be pleased to receive comments, to consider suggestions, and to answer questions of our readers and to establish contact and cooperation with anyone interested. Please write to

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**Due to summer recess our next
Newsletter will be published in
October 1982.**

**Have a nice holiday,
and don't forget**

IFAC ANNIVERSARY DAY



OCT. 1 IN HEIDELBERG