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Sixth World Congress of IFAC

The theme for the IFAC/75 Congress, Boston/Cambridge, Massachusetts, USA, August 24 to 30, 1975, will be CONTROL TECHNOLOGY IN THE SERVICE OF MAN. The American Automatic Control Council, the US National Member Organization of IFAC, with the co-operation of the Massachusetts Institute of Technology and Harvard University, will be host to IFAC/75.

The Technical Program which will be arranged in co-ordinated groups of special interest sessions will include both invited and contributed papers. Among the special interest sessions planned are:

APPLICATIONS
- Electric Power Systems
- Chemical Process Applications
- Process Identification and Modelling
- Metal and Mining Industry Applications
- Pulp and Paper
- Safety Aspects of Power Reactor Control

COMPONENTS AND INSTRUMENTS
- Fluidics
- Automatic Testing

COMPUTERS
- Computer Control Case Histories
- Hardware-Software Tradeoffs in Computer Control
- Microcomputers in Control Systems
- Software for Control Computers including Special Languages
- Testing, Debugging, Noise and Reliability in Computer Control
- Interfacing the Process Computer to the Operator

ECONOMIC AND MANAGEMENT SYSTEMS
- Control and Management of Human Activity Systems

EDUCATION
- Control System Laboratories

SOCIAL EFFECTS OF AUTOMATION

SPACE
- Mobility Aids for the Space Shuttle

SYSTEMS ENGINEERING
- Planning and Management of Water Resource Systems
- Hospital Automated Monitoring Systems
- Health Care Emergency Communication Systems
- Transportation Systems
- Systems Analysis and Modelling Approaches in Environmental Systems
- Urban, Regional and National Planning
- Complex Hierarchical Systems
- System Reliability Analysis and Design

THEORY
- Computational Methods in Control
- Distributed Parameter Systems
- Algebraic Methods in Control
- Differential Games
- Nonstandard Control Problems
- Adaptive Control.

The procedure for submitting draft manuscripts of papers and abstracts (deadline September 1, 1974) is included in a Second Announcement brochure which can be obtained from

IFAC/75 Secretariat, 400 Stanwix Street,
Pittsburgh, Pennsylvania 15222, USA.

Optimization Methods (Applied Aspects)

The IFAC/IFORS Symposium, sponsored by the IFAC Technical Committees on Theory, on Systems Engineering, and on Applications and co-sponsored by the International Federation of Operational Research Societies (IFORS), will be held at the Golden Sands resort near Varna, Bulgaria, from October 8 to 11, 1974. It is organized by The National Centre of Cybernetics and Computing Technology of the Committee for Science, Technical Progress and Higher Education (National Member Organization of IFAC) and by The Scientific Technical Union of Electrical Engineering.

The Symposium is aimed above all at the application of Optimal Control Theory. The basic topics are:
- Linear and Nonlinear Programming
- Dynamic Programming
- Optimization Methods with Incomplete Information
- Numerical Methods
- Quasi-Optimal Control Methods
- Function Space Methods
- Optimal Control for Large-Scale Systems
- Optimization of Multilevel Control Systems
- Decomposition Techniques for Optimal Control
- Sensitivity Analysis of Optimal Systems
- Differential Games
- Optimization of Biological and Economical Systems.

The International Programme Committee chaired by *Prof. N. Naplatanoff* selected 52 technical papers by authors from 15 countries. These papers, divided in three categories, viz.
- Applied Mathematical Programming
- Large Scale Systems
- Synthesis of Optimal Feedback Systems

will be presented and discussed in 15 technical sessions.

Survey papers by invited speakers will be delivered on:
- Computational Methods for Optimization
- Synthesis of Optimal Feedback Systems
- Large Scale and Hierarchical Systems.

Panel Discussions are planned on
- Applied Optimization Today and Tomorrow
- Theory and Practice of Large Scale Systems
- Contemporary Problems of Applied Optimal Control.

The conference languages are English and Russian and simultaneous translation will be provided.

Registration fee (incl. preprints) for participants: US $ 60 (or 60 convertible roubles for participants from specific countries as listed in the Second Announcement brochure); reduced fee for participating students: US $ 10 or 10 convertible roubles; for accompanying persons: US $ 15 or 15 convertible roubles.

Copies of the Second Announcement brochure including registration and hotel accommodation forms can be obtained from

IFAC/IFORS '74,
Scientific Technical Union of
Electrical Engineering,
108 Rakovski Street,
Sofia, Bulgaria.

Stochastic Control

Sponsored by the IFAC Committees on Theory and on Applications and organized by the Hungarian Academy of Sciences, the Bolyai Mathematical Society, the Hungarian John von Neumann Computer Society, the Scientific Society of Measurement and Control, and the Computer and Automation Institute of the Hungarian Academy of Sciences, the IFAC Symposium on Stochastic Control will be held in Budapest, from September 25 to 27, 1974.

The aim of the symposium is to discuss the present status of stochastic control theory and its applications.

Pre-selection on the basis of abstracts of papers offered by authors from 25 countries has resulted in the provisional acceptance of 127 abstracts subject to final acceptance on the basis of full papers being under review by the International Programme Committee (Honorary Chairman: *A. N. Kolmogorov,* USSR; International Chairman: *H. Kwakernaak,* Netherlands).

An extract taken from the tentative classification of the titles into sections will give an idea of the topics planned to be covered:

- Duality theorems, optimal of unconstrained and constrained stopping decision problems of discrete and continuous systems concerning Markovian and Semi-Markovian processes.
- Stability of dynamic systems, nonlinear processes, with or without state or control dependent noise. Filtering of recursive nonlinear systems, cascad structural filtering, using Kolmogorov-Wiener and Kalman-Bucy theory.
- Control of stochastic systems, processes with distributed parameters, the optimization with respect to variance, various observation cost in linear, nonlinear cases, methods of optimal pointwise control, closed loop algorithms using Gaussian approximation dual control in discrete time systems, optimal stochastic observability and controllability, incomplete information stabilization problems, construction of invariant sets in differential games.
- Statistical inference, identification and estimation in stochastic processes.
- Algorithms for global extremum, simultaneous estimation, classification problems. Stochastic approximation in constrained systems and learning classification from weakly dependent samples.
- Closed loop cross correlation technique applied to adaptive control. Stochastic control of linear, nonlinear discrete or hierarchical systems, applied to industrial production systems with random failures and repairs. Self tuning and dual control theory, applied to ore crushers. Data flow control in networks and computers for automatic control of reactors.
- Computer oriented topics dealing with application packages and modelling the computers themselves.
- Control of M/M/1 GI/G/1 stochastic service systems, computer system reliability, dynamic scheduling of optimum routes for DIAL-A-BUS systems.

A more comprehensive report on the topics of technical papers likely to be presented and discussed at the symposium appears in the Second Announcement brochure which can be obtained from the address given below. The brochure also includes registration and hotel accommodation forms. Registration fee (incl. preprints): 240,– SFr. (or equivalent).

The symposium language will be English.

Interested readers should contact:

The Conference Bureau,
Computer and Automation Institute
of the Hungarian Academy of Sciences,
H-1502 Budapest 112, P. O. Box 63, Hungary.

Discrete Systems

The IFAC Symposium on Discrete Systems will be held in Riga, Latvian SSR, USSR, from September 30 to October 4, 1974, under the auspices of the USSR National Committee of Automatic Control, the Scientific Council on Complex Problems of Cybernetics of the Academy of Sciences of the USSR, the Order of Lenin honored Institute of Control Problems of the Academy of Sciences of the USSR, and the Institute of Electronics and Computing Technique, Academy of Sciences, Latvian SSR.

The International Programme Committee under the chairmanship of Academician *E. A. Yakubaitis,* USSR, has accepted 115 technical papers which will be presented and discussed in parallel sessions arranged according to the following section topics:

- The Synthesis of Discrete Systems
- Diagnostics and Reliability of Discrete Systems
- Automation of Synthesis
- Probabilistic Automata and the Collective Behaviour of Automata
- Cellular Arrays
- General Problems of Automata Theory.

Plenary papers on

- Problems of Logical Synthesis and Synthesis Automation for Discrete Control Devices
- Application of Methods of Automata Theory for Designing Industrial Control Devices
- Data Transfer in Computers with Cellular Structure
- Realization Principles and Peculiarities of the Logical Design of Automata Employing Cellular Logic Arrays
- Aperiodic Self-synchronization Automata

will be presented, and discussion sessions on Automata Diagnostics and on the Problems of Automata Synthesis are planned.

The official languages at the symposium will be English and Russian.

In addition to the scientific programme, visits to the laboratories of the Institute of Electronics and Computing Technique will be arranged, and a social programme will be provided which covers sightseeing tours, a concert, a reception and a banquet.

Proceedings (5 volumes set) will be published and handed to the registrants at the registration desk (on September 29 at the Riga Hotel, on September 30 at the Institute of Electronics and Computing Technique).

Registration fee: US $ 60 for attendees, US $ 30 for accompanying persons; payable in any currency at the official rate of exchange. Prospective attendees are asked to remit, possibly by August 1, 1974, the fee to Account No. 1114132 with the Republic Department of the State Bank of the USSR in Riga (Latvian SSR), indicating "For participation in the Symposium on Discrete Systems" and the name of the participant.

Potential participants from outside the USSR should make their travel arrangements with a tourist agency acting on behalf of "Intourist". They will be served according to category "A" service and be provided with full information about the travel to the Riga Symposium.

For further details and copies of the programme contact:

Institute of Electronics and Computing Technique,
Academy of Sciences, Latvian SSR,
14, Akademijas St., Riga – 226006, USSR.

Multivariable Technological Systems

The 3rd IFAC Symposium on Multivariable Technological Systems, organized by The Institute of Measurement and Control under the aegis of the United Kingdom Automation Council, will be held at the University of Manchester, U.K., from September 16 to 19, 1974.

The principle theme of the Symposium will be the development and application of design techniques for the feedback control of multivariable technical systems. Subsidiary themes will be the construction of models for a wide range of engineering multivariable systems and the techniques of identifying and validating such models; comparisons of different types of design technique applied to industrial problems; use of computeraided-design techniques for multivariable feedback system design; applications of multivariable feedback control to a wide range of industrial processes; multilevel and hierarchical control; and adaptive control.

Papers dealing with industrial applications in the following fields of control will be presented:

- Process industries
- Prime movers
- Electrical power plant
- Aircraft and helicopters
- Electrical drives
- Surface transportation systems.

The scientific programme will cover the presentation of a Survey Paper on "Theory and its Relation to Design" by *Prof. A. G. J. MacFarlane,* Chairman of the Organizing Committee, the presentation and discussion of Full Papers in Plenary Sessions on

- Multilevel and Hierarchical Systems
- Development of Design Techniques
- Nuclear and Power Systems
- Process Industry Applications
- Other Industrial Applications.

Furthermore, Short Papers will be presented and discussed in late afternoon parallel sessions. Provision has also been made for Round Table Discussion Sessions and for the presentation of specially invited case-history papers.

In all, over 60 papers will be presented by authors from 14 countries.

The symposium language will be English. Preprints of papers in English will be distributed to all participants. Copies of synopses in French and German will be available for those participants requesting them. The proceedings of the Symposium, together with extracts from the discussion, will be published by the Institute of Measurement and Control during 1975.

Advance registration is essential. Registration deadline, subject to space, is September 12, 1974. All registration details for participation on a residential basis (accommodation at Owens Park, a residential complex of the University of Manchester) or on a non-residential basis can be taken from the "Second Announcement and Registration Form" brochure obtainable from

The Secretary,
3rd IFAC Symposium on
Multivariable Technological Systems,
The Institute of Measurement and Control,
20 Peel Street, London W 8, U.K.

Control in Power Electronics and Electrical Drives

This is the title of a symposium sponsored by the IFAC Technical Committees on Applications and on Components and Instruments and organized by the VDI/VDE-Gesellschaft Mess- und Regelungstechnik (National Member Organization of IFAC). It will be held in Düsseldorf at the Congress Centre of the New Fair Grounds from October 7 to 9, 1974.

At the Symposium, systems involving power convertors, especially in connection with electrical drives, will be treated and their control properties including their overall design will be discussed.

The International Programme Committee is chaired by *Prof. W. Leonhard,* FRG, and comprises 15 outstanding specialists in the field. A hundred selected technical papers will be discussed in sessions covering the following topics:

THEORY OF CONTROL SYSTEMS EMPLOYING ELECTRONIC POWER CONVERTORS
- Dynamic Behaviour of Convertors
- Analysis, Synthesis and Simulation of Convertor-Fed Drives
- Identification and Optimisation of Controlled Drives

CONTROLLED ELECTRONIC POWER CONVERTORS
- Convertor Circuits
- Simulation and Design of Convertor Circuits
- Control of Power Convertors

CONVERTOR-FED AC- AND DC-MOTOR DRIVES
- Synchronous Machines with Convertor Supply
- Asynchronous Machines with Variable Frequency Convertor Supply
- Asynchronous Machines with Line Frequency Supply and Thyristor Control
- DC-Drives

APPLICATIONS OF CONTROLLED DRIVES
- Examples of Controlled Drives
- Problems of Mechanical Oscillations Caused by Resilient Load

APPLICATIONS IN TRACTION AND ELECTRIC GROUND TRANSPORTATION
- Vehicle Drives with AC-Supply
- Vehicle Drives with DC-Supply

APPLICATIONS IN SPECIAL FIELDS OF STATIC POWER CONVERSION
- High Voltage DC-Transmission (HVDC)
- Intermediate Frequency Convertors for Inductive Heating
- Interactions between Convertor and Feeding Line
- Controlled Power Supplies.

Relevant survey papers will be presented by *J. Lagasse* and *R. Prajoux* (France), *W. McMurray* (USA), *H. Bühler* (Switzerland), *J. McTaggart* (UK), *I. Neuffer* and *F. Wesselak* (FRG), *F. Kövessy* (Hungary), *K. Meyer* (Switzerland), *K. Heumann* (FRG), *E. Uhlmann* (Sweden). Conference languages are English and German and simultaneous translation will be provided. Arrangements have been made for interested engineers to inspect modern works installations, designed by AEG, BBC and Siemens, at Hoesch Hüttenwerke AG Dortmund and Mannesmann-Röhrenwerke AG Mülheim/Ruhr.

Registration fee (incl. preprints): DM 200.– before August 31, 1974; DM 230.– after that date. Copies of the programme and registration and hotel accommodation forms can be obtained from

VDI/VDE-Gesellschaft Mess- und
Regelungstechnik, P. O. Box 1139,
D-4000 Duesseldorf 1, FRG.

The symposium is followed by the 6th International Congress with Exhibition for Instrumentation and Automation (INTERKAMA), which will take place from October 10 to 16, 1974, also at the New Fair Grounds in Düsseldorf. Each symposium attendee may purchase one INTERKAMA ticket at a reduced rate from the symposium secretariat.

Systems Engineering Education in Developing Nations

Sponsored by IFAC (Committees on Education and on Systems Engineering) and co-sponsored by IFORS, an international symposium in the subject area will be held in New Delhi, India, November 4 to 7, 1974. It is organized by the Institution of Engineers (India), National Member Organization of IFAC. The aim of the symposium is to assess the impact of systems theory and analysis in the field of education in developing nations of the world. It is expected that the deliberations and exchange of views will bring out the various ways and means in which systems engineering can modernize the engineering activities so as to help the engineers and planners in expeditiously solving the complex and intricate multi-disciplinary problems in respect of large scale integrated projects.

Over 100 papers were offered from throughout the world and the selection has been handled by an International Programme Committee chaired by *Prof. W. Findeisen,* Poland. Preprints will be made available to early registrants well in advance of the symposium.

Readers interested in attending the symposium should immediately contact

Brig. D. Swaroop, Convener,
c/o The Institution of Engineers
(India), Delhi Centre,
Bahadur Shah Zafar Marg,
New Delhi - 110001, India.

A.I.C.A. Symposia

The Association Internationale pour le Calcul Analogique (A.I.C.A.) which is one of the IFAC sister federations in the Five International Associations Coordinating Committee (FIACC) will hold the following two symposia in which IFAC has been invited to participate:

HYBRID COMPUTATION IN DYNAMIC SYSTEMS DESIGN

Rome, Italy, November 11 - 14, 1974. Venue: Consiglio Nazionale delle Ricerche, Piazzale delle Scienze 7.

About 80 technical papers will be presented and discussed in areas of

COMPUTING METHODS & STRUCTURES
METHODS OF HYBRID COMPUTATION FOR
- Identification and Synthesis
- Optimization
- Analysis of Distributed Systems

APPLICATIONS OF HYBRID COMPUTATION TO INDUSTRIAL SYSTEMS:
- Chemical
- Iron & Steel
- Mechanical
- Aerospace
- Electrical & Electronic
- Nuclear

APPLICATIONS OF HYBRID COMPUTATION TO ENVIRONMENTAL SYSTEMS:
- Ecological
- Social

APPLICATIONS OF HYBRID COMPUTATION TO BIOMEDICAL SYSTEMS

Survey papers will also be presented and round table discussions devoted to education in hybrid computation and to the actual and the future role of hybrid computation in dynamic systems design. A visit to the Hybrid Computation Center of Comitato Nazionale per l'Energia Nucleare is also planned.

The symposium language will be English.

Registration fee before October 10, 1974: US $ 50; after that date: US $ 60. The rate includes a copy of the proceedings available at the symposium and the participation in social events.

Further details and registration forms can be obtained from

Prof. Alessandro De Carli,
Istituto di Automatica, Universita' di Roma,
Via Eudossiana, 18, 00184 Roma, Italy.

COMPUTER METHODS FOR PARTIAL DIFFERENTIAL EQUATIONS

Bethlehem, Pennsylvania, USA, January 15 - 17, 1975. Venue: Lehigh University.

Papers are invited on all aspects of recent developments in the computer solution of partial differential equations. This includes:

METHODS
- New developments in difference methods,
- Finite element methods,
- Analog/hybrid and related methods,
- Algorithms for parallel computers.

PROGRAMMING
- Programming languages for PDE's,
- Program organization and style for PDE's.

HARDWARE
- Special computer configurations for PDE's: parallel computers, analog/hybrid computers, Networks and special hardware.

APPLICATIONS
- Significant developments in the application of the computer solution of PDE's to engineering and scientific problems.

Authors are invited to send a statement of intent to submit a paper to the PROGRAM CHAIRMAN. All accepted papers will appear in the Proceedings of the Symposium.

- Statement of intent: Any time before September 15
- Deadline for manuscripts: October 1, 1974
- Notification of acceptance: October 15, 1974
- Final manuscript due on special typing forms: December 1, 1974.

PROGRAM CHAIRMAN

Professor W. E. Schiesser,
Computing Center, Lehigh University,
Bethlehem, Pennsylvania 18015, USA.

New Publications

AUTOMATIC CONTROL FOR AGRICULTURE - The publication contains 36 technical papers (abt. 400 pages) presented at the IFAC Symposium on Automatic Control for Agriculture, University of Saskatchewan, Saskatoon, Canada, June 18 - 20, 1974, in sessions on Tractor Design and Guidance Systems; Instrumentation; Automation in Irrigation and Spraying; Automation in Agricultural Production, Automation in Dairy and Livestock Production; Harvest Automation. The volume is available for $ 10.00 Canadian funds and orders should be sent to *Dr. G. C. Zoerb,* Agricultural Engineering Dept., University of Saskatchewan, Saskatoon, Sask., Canada.

SYSTEM IDENTIFICATION: PARAMETER AND STATE ESTIMATION by *P. Eykhoff,* University of Technology, Eindhoven, Netherlands. The book is concerned with the science of devising optimal types of signal processing with the purpose of deriving information on the dynamics of the system or process under study. The need for this arises in different fields of engineering, in biology, in economics and in ecology. The purpose for which this sort of information is needed can range from scientific research to applications in automatic control and the support of medical diagnoses. It is a treatment both of the state of art and of the science and is a coherent presentation of the field of identification, parameter and state estimation. Appx. 548 pages; appx. £ 11.50. Published by John Wiley & Sons Ltd., Baffins Lane, Chichester, Sussex, UK.