



1990
No. 2
April

International Federation of Automatic Control

Secretariat: Schlossplatz 12, A-2361 Laxenburg, Austria - Phone (02236) 71 4 47, Fax (02236) 72 8 59, Telex 79248 ifac a

Newsletter

Contents:

11th IFAC World Congress,
Tallinn, USSR

*

How to Register for the Congress

*

Decision Support for Patient
Management: Measurement,
Modelling and Control
IFAC Workshop, London, UK

*

Large Scale Systems: Theory and
Applications
IFAC/IFORS/IMACS Symposium
Berlin, GDR

*

Expert Systems and Signal
Processing in Marine Automation
IFAC Workshop, Copenhagen, DK

*

New Publications

*

Newly Approved Events

*

Papers from the Next Issue of
Automatica

*

DYCORD '89
IFAC/EFCE Symposium
Maastricht, NL

*

Who is Who in IFAC

11th IFAC World Congress Tallinn, USSR, August 13 - 17, 1990

The new Tallinn Congress Centre has already been completed some time ago and is now expecting a large number of members of the international control community to assemble in August on the occasion of yet a further milestone event in the history of our Federation. However, a congress is only partly made successful by its organizers and those who compile the program, but its success hinges upon you, the people who want to exchange views and who come to listen to what is new in the field of automatic control.



The Congress Centre in Tallinn

How to Register for the Congress

The Final Program and the registration form for the 11th IFAC World Congress are now available.

Interested persons who submitted a return card will receive or have already received the Program together with the registration form from the Tallinn organizers. The registration fee for early registration (until 30 April) is sfr 600,-, after that date it is sfr 700,-.

Should you be interested in participating in the World Congress but have not yet received Program and registration form, please claim it from

IFAC '90 Congress Secretariat
Valmet Automation OY
Headquarters
PO Box 293
SF-00121 Helsinki, Finland

or contact the

IFAC '90 Congress Secretariat
Institute of Cybernetics
Akadeemia tee 21
200 108 Tallinn, USSR
Tel: 52 56 22, 52 54 35
telex: 173267
Fax: 7-0142-527901

Decision Support for Patient Management: Measurement, Modelling and Control

IFAC Workshop

London, UK, 31 Aug. - 2 Sept., 1989

This workshop followed the very successful IFAC/IMEKO Symposium on Modelling and Control in Biomedical Systems, held in Venice in the spring of 1988. In this workshop, the theme was more focussed considering the issues of measurement, modelling and control in the provision of decision support for patient management. This is an important and growing application area of medical informatics and related disciplines and in this sense the workshop was timely. Indeed the international significance of the theme was highlighted by the fact that more than 20 nationalities were represented amongst the 61 participants who registered for the whole of the workshop.

The format of each of the two days consisted of a keynote address followed by 4 further oral presentations. The first half of each afternoon took the form of a structured poster session with subsequent discussion, followed by a round table discussion. The first keynote address was given by Dr. Hacisalihzade (University of California and Berkeley) and Prof. Linkens (University of Sheffield) surveying the automatic control of drug delivery. The second was given by Prof. Sheppard (University of Texas) on the application of knowledge based techniques to the control of biomedical systems. These two papers set the scene for the more detailed and specific contributions which were to follow.

A very high standard of presentation was evidenced by both the oral contributions and the poster displays. From a methodological point of view most of the contributions came under one of the following categories: measurement and information processing, modelling, tactical control, or strategic control/decision support. Prominent amongst the clinical applications areas were a range of issues associated with critical care medicine and a number of applications in the field of diabetes.

The themes of the round table discussions were "Problems of introducing decision support systems into clinical practice" and "Software safety and reliability". Both these are very important current topics which produced lively discussion. This discussion was facilitated by the fact that a significant number of the participants were clinicians who did more than enough to ensure that the meeting concerned itself with the real problems of applying measurement, informatics and control rather than with theoretical and abstract issues.

All in all the meeting was widely regarded as being highly successful. It was one of those meetings where the chemistry seemed right, both in the scientific and technical sessions and in the excellent social program which culminated in a fine dinner overlooking a floodlit River Thames. This workshop will undoubtedly be the first of an ongoing series and number two is now awaited with keen interest.

E.R. Carsen, IPC Chairman

Large Scale Systems: Theory and Applications

IFAC/IFORS/IMACS Symposium
Berlin, GDR, 29 - 31 August, 1989

The Large Scale Systems Symposium Berlin '89 was the 5th in a series which was started in 1976 in Udine (I) and continued in Toulouse (F), Warsaw (PL) and Zurich (CH). It was organized by the NMO of the GDR, the Scientific-Technological Society of Measurement and Automatic Control, and took place in the new Conference Centre which is situated in the heart of Berlin and was rebuilt on the occasion of the 750th anniversary of the city.

The Symposium gathered 197 participants coming from 24 countries (103 from the GDR). A total of 111 papers (from 150 proposed) had been selected for presentation by the IPC (31 from the PRC, 22 from the GDR). The main subject areas in theory and methodology were: Analysis of large scale systems (stability, robustness, qualitative methods), decentralized control, hierarchical control, decision making in LSS (multicriteria problems), and decision support/expert systems. The main fields of application selected for this symposium were manufacturing systems, energy systems, water systems, agricultural and environmental systems.

The problems may be regarded as especially important for the present work in the field of LSS and have also been in the focus of interest in the plenary lectures and in the two discussion sessions:

- The extension, improvement and easy handling of the means for solving LSS problems by including methods and instruments developed within the framework of computer sciences (expert systems, AI);

- The elaboration of practicable methods for repetitive decision making and on-line control in types of processes rarely investigated by control engineers so far, especially in the case of non-coordinated decision units (socio-economic systems), including the question of their cooperation.

The next Large Scale Systems Symposium is planned to be held in Beijing.

K. Reinisch
IPC Chairman

Impressum:

Medieninhaber und Herausgeber:
International Federation of Automatic Control (IFAC),
Zurich
Schlossplatz 12, A-2361 Laxenburg, Austria

Verlagsort und Redaktion:
Dipl. Ing. Dr. Gusztáv Hencsey
Schlossplatz 12, A-2361 Laxenburg

Hersteller:
Artur Schefczik & Sohn
August-Reuss-Gasse, A-1130 Wien

Editor: Gusztáv Hencsey

Layout: Ernestine Rudas

published bimonthly

Expert Systems and Signal Processing in Marine Automation

IFAC Workshop

Copenhagen, DK, 28 - 30 August, 1989

The Workshop was held in Lyngby, Denmark and arranged by the Secretariat of the Danish Automation Society.

The Workshop was organized by the newly established APCOM working group Control Applications in Marine Systems, CAMS. The working group was founded in 1987 with one of its responsibilities to arrange events and establish close relations with professionals in marine engineering and naval architecture. The Workshop was the first event of the working group.

The forming of an IFAC working group on a subject is always a quite significant event, a recognition by colleagues of the level of professional activity, and emphasis in the automatic control society. Against this background, the new working group felt their activity was particular in focus, and the success of the Workshop a measure of the group's accomplishment.

The Workshop went very well indeed. Counting 89 individuals, participation was higher than expected with a distribution of fifty/fifty between Denmark and 12 other countries. More than half of the participants - 47 to be exact - were representing industry, shipowners and shipyards, and a couple were even ship's officers. This is taken as substantial evidence of the interest and practical relevance of the subjects covered. There was vivid debate and exchange of opinions during the entire meeting, and the stated purpose of linking theory with practice was obviously met. A total of 37 papers was presented.

Highlights of the Workshop included presentations of the results of years of effort with Expert System techniques. Many systems had been exposed to real life applications, and results with "real time" systems were presented. The area of marine automation is well understood, and considerable experience exists for daily operation, maintenance and control. Immediate feedback and comments were therefore obtainable on the new ideas. The presentations were generally well received. Another highlight was the presentation and panel discussion of experience with rudder roll damping. This technique utilizes the ship's rudder as a roll damping device, the traditional

ctd page 4

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.

New Publications

Proceedings of the IFAC/IFORS/IMACS Symposium Large Scale Systems: Theory and Applications

Berlin, GDR
29-31 August, 1989

Editors: K. Reinisch
Wissenschaftliche Gesellschaft f. Meß-
u. Automatisierungstechnik in der Kam-
mer der Technik, Berlin, GDR
M. Thoma
Institut f. Regelungstechnik, Universität
Hannover, Hannover, FRG

The papers present new trends of the devel-
opment of theory and applications in the field
of large scale systems analysis, planning and
control. The issues discussed are proving to
be of great importance as systems of growing
complexity are found in all fields of human
activities, often developed by economic,
organizational and technological effects. The
papers are divided into three main areas of
interest: Modelling, Analysis, Basic Controls;
Superordinate Control and Decisions; Appli-
cations.

Proceedings of the IFAC/IFIP/IFORS/CIRP Workshop Decisional Structures in Automated Manufacturing

Genoa, Italy
18-21 Sept., 1989

Editors: A. Villa
Politecnico di Torino, Torino, Italy
G. Murari
Universita di Genova, Genova, Italy

The Workshop brought together researchers
interested in the field of production manage-
ment in automated manufacturing, who pro-
vided papers from different standpoints of in-

dustrial automation, manufacturing and informa-
tion technologies and system management meth-
odologies. These contributions cover virtually
all the principal aspects and problems relevant
to production management ranging from production
control in flexible manufacturing systems (FMS)
and robotized cells, to production scheduling and
process planning. In addition, methods and tools
for implementing procedures to solve these
problems and for integrating such procedures into
a hierarchical architecture are also included.

Proceedings of the IFAC Workshop (8th) Control Applications of Nonlinear Programming and Optimization

Paris, France
7-9 June, 1989

Editors: H. B. Siguerdidjane
(Plateau du Moulon, France)
P. Bernhard
Sophia Antipolis, Valbonne, France

These proceedings provide valuable information
on the exchange of ideas between scientists who
apply non-linear programming and optimization
to real world control problems and those who
develop new methods, algorithms and software.
The papers deal with windshear problems, opti-
mization of aircraft and spacecraft trajectories,
optimal control for robots, the optimization of
urban traffic control, general mechanical systems,
multilevel inventory systems and robust control.

Proceedings of the IFAC/IFIP/IEA/IFORS Conference (4th) Analysis, Design and Evaluation of Man-Machine Systems

Xian, China, P. R.
12-14 September, 1989

Editor: Hu, Baosheng
Xian Jiaotong University, China, P. R.

The twenty seven papers cover recent advan-
ces in both empirical and theoretical aspects of
man-machine interaction with special emphasis
on the subjects of man-automation and man-
computer interaction. They provide information
on a subject which has grown rapidly in
importance during recent years.

Proceedings of the IFAC/IFORS/IFIP/SEDC Conf. Dynamic Modelling and Control of National Economies

Edinburgh, UK
27-29 June, 1989

Editor: N. M. Christodoulakis
Athens School of Economics and Busi-
ness Sciences, Athens, Greece

The Symposium aimed at analysing and solving
the various problems of representation and
analysis of decision making in economic
systems starting from the level of the individual
firm and ending up with the complexities of
international policy coordination. The papers
are grouped into subject areas such as game
theory, control methods, international policy
coordination and the applications of artificial
intelligence and experts systems as a frame-
work in economic modelling and control. The
Symposium therefore provides a wide range of
important information for those involved or inter-
ested in the planning of company and natural
economics.

For further details and pricing information
please contact

Marketing Department
Pergamon Press plc
Headington Hill Hall
Oxford OX3 0BW, UK

Newly Approved Events

Title	Date	Place	Deadlines	Further Information
IFAC/EWICS/IFIP Symposium Safecom '90 - Safe Secure Reliable Computing	Oct.30- 2 Nov. 1990	Gatwick UK	-	SARS Ltd, Clayton House 59 Piccadilly, Manchester M1 2AQ United Kingdom
IFAC Workshop (3rd) Artificial Intelligence in Real Time Control	Sept. 23-25 1991	Napa, CA USA	*	Dr. G. Suski, Lawrence Livermore Nat. Lab., Programme Leader 7000 East Ave, Livermore, CA 94550, USA
IFAC Workshop Algorithms and Architectures for Real Time Control	Sept. 1991	Bangor Gwynedd, UK	*	Prof. J. Fleming, School of El. Engg. Science, University of Wales Bangor, Dean Street, Bangor, Gwynedd LL57 1UT, UK
IFAC Symposium On-Line Fault Detection and Supervision in the Chemical Process Industries	April 22-24 1992	Newark Delaware USA	*	Dr. Prasad Dhurjati, Dept. of Chem. Engg, University of Delaware Newark, DE 19711, USA
IFAC Symposium (7th) Information Control Problems in Manufacturing Technology	June 15-18 1992	Toronto Ontario Canada	*	Prof. J. Scrimgeour, Senior Advisor Advanced Manufacturing Technol. and Industrial Automation, Div. of El. Engg, National Research Council Ottawa, Ont., Canada K1A 0R8

* deadline not yet known - deadline past

Survey Papers

Fault Diagnosis in Dynamic Systems Using Analytical and Knowledge-Based Redundancy - A Survey and Some New Results (P.M. Frank)

Papers

Simulation, Controller Design, and Field Tests for a Hydro Power Plant - A Case Study (K.H. Fasol, G.M. Pohl)
Frequency Weighted Controller Reduction Methods and Loop Transfer Recovery (Y. Liu, B.D.O. Anderson)
Optimality and Robustness of Linear-Quadratic Control for Nonlinear Systems (M. Ikeda, D.D. Siljak)
Fuzzy Control Theory: A Nonlinear Case (H. Ying, W. Siler, J.J. Buckley)
Heuristically Enhanced Feedback Control of Constrained Discrete Time Linear Systems (M. Sznajder, M.J. Damborg)
Strong Consistency of Parameter Estimates in Direct Self-Tuning Control Algorithms Based on Stochastic Approximation (M.S. Radenkovic, S.S. Stankovic)
Recursive Nonlinear Estimation: A Geometric Approach (R. Kulhavy)

Brief Papers

A Novel Approach to Speed Control of Hydro Power Stations (G. Ferretti, C. Maffezzoni, V. Rossi)
Nonlinear Disturbance Decoupling Control of a Binary Distillation Column (R. Castro, Jaime Alvarez, Joaquin Alvarez)
On the Choice of Controller and Sampling Period for Linear Stochastic Control (B. Lennartson)
Modeling of Continuous Time Systems Using a Discrete Time Representation (J. Schoukens)
Design of High Gain Regulator by Multiple Time Scale Approach (S. Murata, Y. Ando, M. Suzuki)
Contractible Controller Design and Optimal Control with State and Input Inclusion (A. Iftar, U. Ozguner)
A Modified EW-RLS Algorithm for Systems with Bounded Disturbances (C.C. De Wit, J. Carrillo)
M-Estimators and Gnostical Estimators for Identification of Regression Model (J. Novovicová)
Appropriate Automation for Flexible Manufacturing (T. Martin)

Book Reviews

Encyclopaedia of Artificial Intelligence Vols. 1 & 2, by S.C. Shapiro, Ed.-in-Chief (K.J. Aström)
Expert Systems 1987, An Assessment of Technology and Applications by T.C. Walker & R.K. Miller (K.J. Hunt)

role of Finn stabilizers. The multivariable control problem has been addressed by five to six groups world-wide, and results from sea-tests with practical implementations exist. Most of the groups were present at the meeting. The issue as to what extent prediction control can compensate for low slew rate steering gears on a rudder has considerable economic impact and was discussed quite extensively. It was generally appreciated that RRD is now commercially feasible. However, certain issues of the non-linear control problems were considered to pose a challenge to design methods.

Industrial visits during the workshop were well in line with the program. The Danish Maritime Institute showed 3-D simulation and presentation of ship manoeuvres, and the Marine Division of Soren T. Lyngso A/S presented their latest development in total ship integrated control using distributed process computer technology.

The main sponsor of the Workshop was APCOM with COMPUT and EDCOM being co-sponsors.

Mogens Blanke, Working Group Convener

Dynamics and Control of Chemical Reactors, Distillation Columns and Batch Processes

IFAC/EFCE Symposium
Maastricht, NL, 21 - 23 Aug., 1989

Compared to the first DYCORDER Symposium (held in Bournemouth, UK 1986), the scope of DYCORDER '89 included dynamics and control of batch processes as an additional third topic. There were 189 participants from 19 countries of whom 123 work in industry.

For each of the three main topics there was a plenary survey paper, all emphasizing the broad diversity of processes, operating conditions and problem solutions. A fourth plenary presentation was devoted to the interactions between process design and process control. It highlighted singular value analysis as a tool for assessing plant operability, with consequences for the process structure.

A plenary panel session focussed on "Sense and nonsense of artificial intelligence for process control". The number of industrial applications still appears to be very small.

There was a good number of papers on industrial applications of advanced control techniques. Solutions were offered for control of distillation columns with high purity products. A lasting problem is the choice of control structures.

Two technical sessions were devoted to the application of artificial intelligence techniques to process control. Two of the papers were about neural networks, introduced by a tutorial in a well-attended early morning session.

In general, model-based techniques are making headway in industry, often combined with parameter estimation. A major problem is "coping with diversity" which requires adaptation of general methods based on process insight. The symposium scope appears to attract many papers and participants, with much interest from industry. As a consequence, a third symposium is being planned for 1992.

Prof. J.F. MacGregor, Prof. J.E. Rijnsdorp
Prof. T. Takamatsu, Dr. B.D. Tyreus

WHO IS WHO IN IFAC



Prof. Ülo Jaaksoo
Co-Chairman of the Tallinn IPC

Professor Ülo Jaaksoo was born in 1939. He graduated from the Tallinn Technical University, Estonia in 1962. He completed his PhD in multivariable adaptive control in 1969. In 1983 he obtained the DSc degree in computer aided control system design. In 1985 he was given a tenure as professor of engineering cybernetics in the Department of Automatic Control of the Tallinn Technical University.

Professor Jaaksoo has been with the Institute of Cybernetics of the Estonian Academy of Sciences since 1962. He is now director of the Institute of Cybernetics and Vice President of the Estonian Academy of Sciences.

In 1962-1963 he worked at the Institute of Control Sciences in Moscow, USSR as a research scientist. During the years 1963-1969 he was involved in the development of multivariable adaptive process control systems. From 1970-1980 his task was computer aided design of multivariable discrete-time control systems. 1980-1984 he was the head of a department of process control and leader of several research projects in this area. 1984-1989 he was a Deputy Director and is now Director of the Institute of Cybernetics. Professor Jaaksoo has also had comprehensive teaching experience at the Tallinn Technical University.

Professor Jaaksoo has been active in IFAC since 1975, participating in several IFAC events as active IPC member and/or presenting papers, etc. He has been Vice-Chairman of the Components and Instruments Technical Committee in this triennium. At the moment, Professor Jaaksoo is busy with preparations for the 11th IFAC World Congress in Tallinn, for which, together with Professor Vadim Utkin, he is one of the IPC Chairmen.