IFAC International Federation of Automatic Control
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Newsletter

Contents:

IFAC Council- and Related Meetings Copenhagen, Denmark, 5 – 8 July, 1994

This year, the IFAC Council had the pleasure of accepting the invitiation of the Danish Automation Society, the Danish NMO of IFAC, to hold its annual Council- and Related Meetings in Copenhagen, in conjunction with the IFAC/IFORS Symposium on Identification and System Parameter Estimation - SYSID '94.

Before the Council Meeting proper, which took place on 8 July, 1994, the following IFAC bodies held their sessions: Two of the Coordinating Committees, i.e. the CC on Transportation and Vehicles and the CC on Infrastructure and Resources met in Copenhagen, as well as the Policy Committee; the Administrative- and Finance Committee; the Cuénod Trust Fund Committee; the Publications Commitee and the Publications Managing Board, which held part of their committee meetings jointly; the Automatica Editorial Board; the International Program Committee of the San Francisco Congress; the Technical Board and the Executive Board.

At the Council Meeting, the President first welcomed Prof. Katsuhisa Furuta as a new Council member. Prof. Furuta replaces Prof. A. Ishikawa, who was appointed to a very high position in Japan. The President then highlighted his report, referring in particular to the amendments to the Constitution which had been completed in February 1994. He further reported on the excellent performance of tasks by the Coordinating Committees. One very important aspect for the good cooperation within IFAC and between IFAC and the outside world is the speedy communication possible by means of fax but in particular e-mail. This is extremely valuable, as e-mail is available practically worldwide to everyone with access to a computer. IFAC has meanwhile installed an electronic bulletin board (cf. page 2) so that information about IFAC is even more easily accessible to interested persons all over the world.

Further, the President reported that intensive considerations had been made and correspondence exchanged among the members of FIACC. The President stated that membership in FIACC was no longer required in a changed world to ensure good cooperation and co-sponsorship with related organizations. The proposal to the Council, to withdraw from FIACC was unanimously approved. The President stressed, however, that co-operation with the other members of FIACC would be as intensive as ever.

The Chairman of the Technical Board informed the Council about the implementation of its new structure. There are presently 46 Technical Committees guided by nine Coordinating Committees. He then also reported on the Meeting of the San Francisco International Program Committee. At the San Francisco Congress there will be, among other activities, 5 plenary talks, benchmark papers, poster and invited sessions (a more detailled report on the San Francisco IPC will be published in one of the next issues of the IFAC Newsletter). A further feature of the next IFAC World Congress is that it will be preceded by Workshops (cf. Call for Workshops, page 2). The next meeting of the Congress IPC will take place in Orlando, USA in December 1994. It will be followed by two further IPC meetings, one in conjunction with the next Council- and Related Meetings in 1995 and the last one in conjunction with the CDC in December 1995.

Considerations at the Technical Board had again been made with respect to registration fees at IFAC meetings. It is a constant concern of IFAC that registration fees at IFAC events should be affordable. New procedures for co-sponsorship shall, among others, safeguard that there is no overlap with interests of our National Member Organizations.

The Executive Board Chairman presented a draft leaflet "IFAC at a Glance", which will soon be available to interested persons.

Further, the EB Chairman reported on the Composition of the various Awards Committees.

With respect to publications in general, it was stated that IFAC's Journals, i.e. Automatica and Control Engineering Practice are doing very well. Automatica has gone to publishing 12 issues per year. Control Engineering Practice had a very good start and is already planning on a Special Issue (cf. page 3). Meanwhile IFAC already has two Affiliated Journals, i.e. Engineering Applications of A.I. (ed. L. Motus) and, most recently, the Journal on Process Control (ed. J. Perkins). Elsevier Science Ltd as the IFAC publisher is taking care that they are well aware of any potential changes in the publications sector that occur. Over the past years, IFAC has thus been able to adapt to a changing market. It has taken the step to electronic-based forms of publications. Authors of papers are encouraged to use LaTex style files (cf. Newsletter No 6, 1993) for the production of their papers. The Proceedings of the San Francisco World Congress will be published on CD-ROMs (details will be published in one of the next issues of the IFAC Newsletter).

Another important item on the Council agenda was the discussion about the possible site of the 2005 IFAC World Congress. The President stated that IFAC can consider itself very fortunate to have received six applications for that Congress. This is a sign of very healthy and sound National Member Organizations. In a Closed Council Meeting, the number of applications was narrowed down to three, i.e. the NMOs of the Czech Republic, of Italy and of Japan (in alphabetic order).

The Council Meeting took all day and even the lunch break was used to listen to very interesting presentations made by members of the host NMO giving a survey on automatic control in Denmark.

The next Council- and Related Meetings will take place in Sun City, South Africa, in conjunction with the IFAC Symposium on Mining, Mineral and Metal Processing, end of August 1995. The IFAC Council had received two invitations to host the IFAC Council- and Related Meetings, but in this particular case had been very happy to accept the invitation to come to South Africa to strenghten the links with and establish new contacts to control engineers on that continent.

Call for Workshops
at the IFAC
World Congress
San Francisco, 1996

One-day Workshops will be conducted on June 29 and 30 prior to the 1996 IFAC World Congress in San Francisco. Two types of workshops will be offered: Tutorial workshops will focus on broad, general topics within the overall control field. Advanced control workshop will address specific emerging topics which may be less understood by IFAC members.

If you are interested in organizing and conducting either kind of a workshop, please send a brief proposal by **November 1, 1994** to

Prof. Mike Masten
2309 Northcrest
Plano, TX 75075, USA

Fax: +1/214/995-2770
e-mail: m.masten@ieee.org.

The proposal should contain

- workshop title
- goal
- brief synopsis
- outline of topics
- list of presenters

The criteria for selecting final workshops will focus on anticipated breadth of interest, suitability for industrial attendees, and expected depth/breadth of the presentations.

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New IFAC Electronic Information Server

A new electronic information server for IFAC was started on June 1, 1994. The server contains general information about IFAC as well as its technical activities. The IFAC server can be used as a remote repository of information which can be used from any computer with access to Internet. The information can be accessed by means of popular Internet public domain services, such as ftp, gopher or xmosaic (using the gopher interface). If you do not know if these services are available at your site, consult you system administrator.

The server is operated by Goya Servicios Telematicos S.A., the Spanish operator for Eunet. Its Internet address is ftp.eunet.es (or 193.127.1.2).

To get access to IFAC information, you simply type in your machine:

ftp ftp.eunet.es

When asked for your name, type:

anonymous

When asked for your password, type your e-mail address:

me@mymachine.myplace

Once you have gone through the login procedure, type:

cd gopher/useful/ifac

and then you can use the standard ftp commands:

dir list directory
cd change to another directory
get file get a copy of file into your local directory
quit finish the ftp session

This information may also be accessed at

gopher://gopher.eunet.es/11/useful/ifac

The user commands are:

gopher gopher.eunet.es
go-to Useful Services
go to International Federation of Automatic Control (IFAC)

or, if you are using mosaic:

mosaic gopher://gopher.eunet.es

To post additional information (e.g. IFAC symposium, conference or workshop announcements) to the server, send an e-mail message to:

jpuente@gic.tat.upm.es
(Juan A. de la Puente)

Problems and errors can be reported at the same address.

Control Engineering Practice
Volume 2 Number 4
August 1994

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Abstracts

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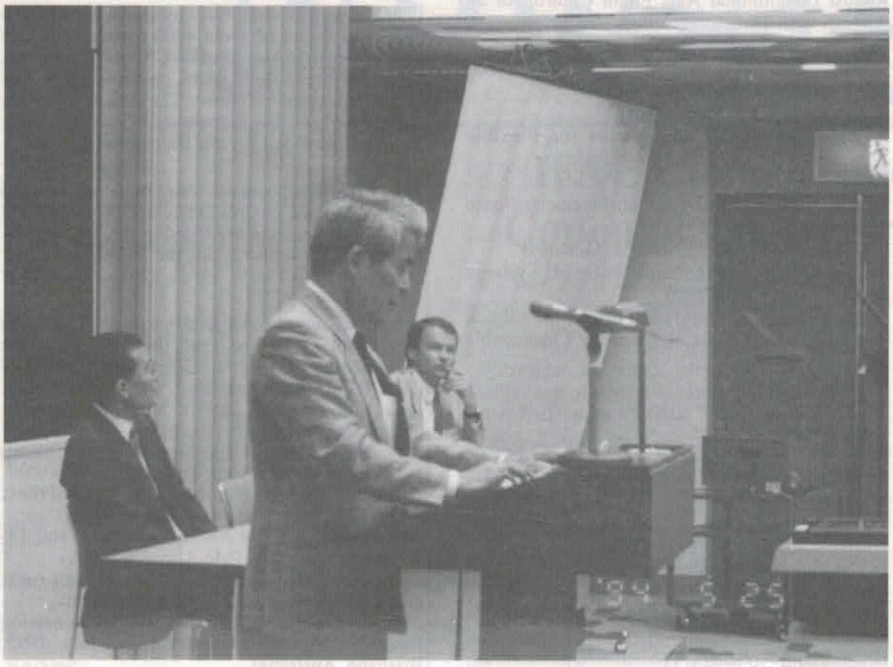
Book Reviews

Conference Calendar

IFAC Symposium (3rd) Advanced Control of Chemical Processes – ADCHEM '94

Kyoto, Japan, 25 – 27 May, 1994



Well-known Japanese organization and hospitality combined to make this a memorable Symposium. Sponsored by the IFAC Technical Committee on Chemical Process Control, this event was the third in a series that began in 1988.

The Symposium provided a forum for presentation and discussion of recent advances in Chemical Process Control. Four topic areas were represented.

1. Dynamic Modelling and Simulation (co-chair: W. Marquardt)
   With advances in computer technology, it has become feasible to perform large computational tasks on-line. This has led to the development of linear and nonlinear model-based control methods. For these techniques as well as for linear MIMO or decentralized controllers, modelling and model validation are of paramount importance.

2. Nonlinear Model-Based Predictive Control and Optimization (co-chair: M. Morari)
   Dynamic models can be used to implement control strategies that include nonlinear constraints in addition to general control and optimization objectives. This way, constrained real-time optimization of chemical processes has become feasible.

3. Statistical Control Techniques (co-chair: N.L. Ricker)
   The statistical interpretation of measured data has received increased attention in recent years. This Symposium has reviewed the major developments in an effort to guide future research in this area.

4. Knowledge-Based vs Model-Based Control (co-chair: D.E. Seborg)
   The utilization of control of qualitative knowledge has been proposed as a complementary approach to traditional quantitative methods. The aim is to integrate systems theoretical aspects from control and optimization theory with more recent developments in artificial intelligence and computer science.

After a careful review process, 85 of the 133 submitted contributions were accepted, 57 for oral and 27 for poster presentation. There were also four invited survey/tutorial plenary talks

- Nonlinear Input/Output Modelling (R.K. Pearson)
- Nonlinear Model Predictive Control: A Tutorial and Survey (J.B. Rawlings)
- The Process Industry Requirements of Advanced Control Techniques: Challenges and Opportunities (R.S. Benson)
- Statistical Process Monitoring and Quality Control of Multivariable Processes (J.F. MacGregor)

Furthermore, a panel discussion on Knowledge-Based vs Model-Based Control Techniques was organized by D.E. Seborg.

Although the meeting focussed on methodological aspects, the papers presented included 18 contributions highlighting industrial experience. The scientific quality of the papers and their presentation were generally very high.

The Symposium took place at the Kyoto Research Park. It was a real success with about 250 participants. For each of the three days of the conference, there were plenary sessions in the morning and parallel sessions followed by a poster session in the afternoon. All 19 technical sessions were very well attended. The 81 contributed papers presented at the Symposium as well as the 4 survey/plenary papers will be published in the IFAC publications series.

Dominique Bonvin, IPC Chair
Iori Hashimoto, NOC Chair

Special Issue
Control Engineering Practice

Call for Papers:
Engineering of Complex Computer Control Systems (ECCCS)

Complex Computer Control Systems are found in transportation, manufacturing, communications, defence, hazardous environments, aerospace, marine environments, robotics, autonomous guided vehicles, energy, mining, mineral and metal processes, chemical and biotechnical processes, health-care and other sectors. In general, complex systems involve the technological integration of computers, communication networks, high-performance networks, multi-media technologies, event/process scheduling, and many other technologies in different areas. Such an architectural framework must incorporate the application of control engineering, real-time computing, fault-tolerant computing, computer safety and security, in order to meet overall system specifications. Different paradigms and methods could play a major part in these developments, and important results may already have been achieved. However, there is always an increasing need to integrate these results in a sensible manner.

Papers are solicited for a Special Issue of the Journal *Control Engineering Practice* on Engineering of Complex Computer Control Systems, with emphasis on contributions from computing and control engineering. Topics of interest include, but are not limited to, the following:

- Computer systems architectures and co-design methodologies;
- Real-time control algorithms and architectures;
- Highly heterogeneous, distributed and parallel platforms;
- Fundamentals of integrated specification and analysis of multiple-criteria functional and non-functional requirements;
- Heuristics for specific steps (e.g. design assessment and evaluations, allocation and optimisation metrics, re-engineering) during engineering of complex computer control systems;
- Computer-aided systems analysis and design;
- Fault tolerance and fault diagnosis;
- Safety-critical systems;
- Expert control;
- Design methodologies;
- Capture of design objective information;
- Performance estimation and prediction;
- Assignment, allocation and optimisation of systems components;
- Standards, and
- Accomplished applications and case studies.

The format of papers, which should have a firm applications base, should comply with the standard procedure for *Control Engineering Practice*. Authors are invited to submit (4) copies of their complete paper to the guest editor:

K F Man
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City Polytechnic of Hong Kong
Tat Chee Avenue, Kowloon, Hong Kong
Tel: (852) 7887754
Fax: (852) 7887791
e-mail: EEKMAN@CPHKVX.CPHK.HK

Deadline for submission of papers:
31 March, 1995

Notification of acceptance:
30 June, 1995

Expected publication date:
December 1995

automatica

The Journal of IFAC the International Federation of Automatic Control

Papers From the Next Issue – September 1994

Papers

Modelling for Control of Rotating Stall
(J.D. Paduanc, L. Valavani et al.)
Cyclomonotonicity, Riccati Equations, and Periodic Receding Horizon Control
(G. de Nicolao)
On the Design of Practically Stable nD Feedback Systems
(Li Xu, O. Saito and K. Abe)
Exact Adaptive Filters for Markov Chains Observed in Gaussian Noise
(R.J. Elliott)

Brief Papers

Transient Stabilization of Power Systems with an Adaptive Control Law
(Y. Wang, D.J. Hill, R.H. Middleton, L. Gao)
Application of Averaging Method for Integro-Differential Equations to Model Reference Adaptive Control of Parabolic Systems
(Keum Shik Hong, J. Bentsman)
Analysis of a Hybrid System Using Symbolic Dynamics and Petri Nets
(P. Peleties, R.A. DeCarlo)
Robust Control by Fuzzy Sliding Mode
(R. Palm)
High-Order Multivariable Transfer Function Curve Fitting: Algorithms, Sparse Matrix Methods and Experimental Results
(D.S. Bayard)
Control of Hydraulic Multi-Motor Systems Based on Bilinearization
(L. Guo, A. Schone, X. Ding)
Robust Adaptive Control: A Slowly Varying Systems Approach
(P.G. Voulgaris, M.A. Dahleh, L.S. Valavani
State Steering by Learning for a Class of Nonlinear Control Systems
(P. Lucibello)
A Unified Approach to Data Association in Multitarget Tracking
(B. Zhou, N.K. Bose)
Variable Structure Adaptive Motion and Force Control of Robot Manipulators
(Bin Yao, S.P. Chan, Danwei Wang)
Multivariable Control System Synthesis, an Experimental Data Based Numerical Approach)
(J-T.H. Chan)
A Contraction Property for State Feedback Design of Linear Discrete Time Systems
(A. Malmgren, K. Nordstrom)

Technical Communiques

Stochastic and Worst Case System Identification Are Not Necessarily Incompatible
(Er-Wei Bai, M.S. Andersland)
Transient Properties of Type m Continuous Time Scalar Systems
(B.A. Leon de la Barra, M.A. Fernandez)
Adaptive Sliding Mode Control of Robot Manipulators: General Manifold Case
(C-Y. Su. Y. Stepanenko)
On Compensation for Neglected Actuator Dynamics
(F. Najson, E. Kriendler)

Book Reviews

Applied Optimal Control & Estimation Digital Design & Implementation, by F.L. Lewis
(R. Vingerhoeds)

Papers From the Next Issue – October 1994

Papers

Grafcet for Intelligent Supervisory Control Applications
(K.E. Arzen)
Robust Longitudinal Axis Flight Control for an Aircraft with Thrust Vectoring
(J.M. Buffington, S.S. Banda, A.G. Sparks)
Identification for Robust Multivariable Control: The Design of Experiments
(C-W. Koung, J.F. MacGregor)
A Balanced LQG Compensator for Flexible Structures
(W. Gawronski)
Decentralized Control Through Parameter Space Optimization
(G.J. Geromel, J. Bernussou, P.L.D. Peres)
Nonlinear Self-Tuning Regulator for pH Systems
(S. Park, S.D. Lee, J. Lee)
Robust Servomechanism Output Feedback Controllers for a Class of Feedback Linearizable Systems
(H. Khalil)

Brief Papers

Sequential Design of Decentralized Controllers
(M. Hovd, S. Skogestad)
Tuning of PID Type Controllers for Stable and Unstable Systems with Time Delay
(Z. Shafiel, A.T. Shenton)
Construction and Parametrization of All Static and Dynamic H2 Optimal State Feedback Solutions for Discrete Time Systems
(B.M. Chen, A. Saberi, Y. Shamash, P. Sannuti)
Nonlinear Field Voltage Control of a Synchronous Generator Using Feedback Linearization
(W. Mielczarski, A.M. Zoijaczkowski)

Book Reviews

Nonlinear Systems Analysis, by M. Vidyasagar
(A.J. van der Schaft)

Software Reviews

Control System Toolbox, the Mathworks Inc., by A. Grace, A. Laub, et al.
(P. van Dooren)

Editor's Note

In the course of the last year, several brochures and booklets have been revised and updated. They are all available from the IFAC Secretariat:

IFAC Information Brochure, edition 1993
Provides, among others, general information on IFAC, its purpose, structure, membership, list of officials, list of IFAC Technical Committees.

IFAC Constitution- and By-Laws amended in 1994

Procedure for the Organization of IFAC Technical Meetings, edition 1994
Provides information to organizers of IFAC technical meetings and guides them through the demanding task of mounting a successful IFAC event.

If you wish to receive any of these booklets, please send an e-mail note or fax, or write to the IFAC Secretariat in Laxenburg, Austria (details as given on the header of the Newsletter)

The IFAC Secretariat is also at your disposal to answer any questions or help you get the right information or contacts.

Master Plan of IFAC Symposia

IFAC organizes some forty technical events each year with a total of about 4000 participants. The major event in IFAC is the **IFAC World Congress**, organized every three years, covering the whole area of Automatic Control. The next Congresses are planned for San Francisco (July 1 - 5, 1996), Beijing (July 4 - 9, 1999 and Barcelona (July 1002).

The **IFAC Symposia** are series of events devoted to a subarea of control. They are typically held every third year and are listed in the Masterplan. Future IFAC events include the following regular Symposia:

Adaptive Control and Signal Processing (ACASP) (next event: 14-16 June, 1995, Budapest, Hungary)
Advanced Control in Chemical Processes (ADCHEM) (last event: 25-27 May, 1994, Kyoto, Japan, location and date of next event not yet decided)
Advances in Control Education (ACE) (next event: 1-2 August, 1994, Kyoto, Japan)
Artificial Intelligence in Real-Time Control (next event: 3-5 October, 1994, Valencia, Spain)
Automatic Control in Aerospace (next event: 12-16 September, 1994, Palo Alto, CA, USA)
Computer Aided Control Systems Design (next event: 28-30 April, 1997, Ghent, Belgium)
Computation in Economic, Financial & Engineering Economic Systems (next event: 2-5 July, 1995, Brisbane, Australia)
Control Design (next event: location and date not yet decided)
Distributed Intelligence Systems (next event: location and date not yet decided)
Dynamics and Control of Chemical Reactors, Distillation Columns and Batch Processes (DYCORD) (next event: 7-9 June, 1995, Copenhagen, Denmark)
Fault Detection, Supervision and Safety for Technical Processes (SAFEPROCESS) (next event: 7-10 September, 1997, York, UK)
Human Skills and Knowledge (next event: 25-28 September, 1995, Berlin, Germany)
Information Control in Manufacturing (next event: 4 - 8 October, 1995, Beijing, China, P.R.)
Intelligent Components and Instruments for Control (last event: 8-10 June, 1994, Budapest, Hungary; next event: location and date not yet decided)
Large Scale Systems (next event: 11-13 July, 1995, London, UK)
Low Cost Automation (next event: 13-15 September, 1995, Buenos Aires, Argentina)
Man-Machine Systems (next event: 27-29 June, 1995, Cambridge, MA, USA)
Mining, Mineral and Metal Processing (next event: 29-31 August, 1995, Sun City, South Africa)
Modelling and Control of Biomedical Systems (last event: 27-30 March, 1994, Galveston, TX, USA; next event: location and date not yet decided)
Non-Linear Control Systems (26-28 June, 1995, Lake Tahoe, USA)
Power Systems and Power Plants (next event: 6-8 December, 1995, Cancun, Mexico)
Robot Control (next event: 19-21 September, 1994, Capri, Italy)
System Identification (next event: 8-11 July, 1997, Fukuoka, Japan)
Transportation Systems (next event: 24-26 August, 1994)

In addition to these Symposia, IFAC organizes **Conferences** and **Workshops**, which are usually smaller meetings on a specific control topic.

Contributions to IFAC meetings are reviewed and the presented papers are published in the IFAC Postprints. Selected papers are also published in the IFAC Journals Automatica and Control Engineering Practice.