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IFAC Council- and Related Meetings
Nantes, France, July 7 – 11, 1998

The annual Council- and Related Meetings of IFAC were held in Nantes, France, in conjunction with the IFAC Conference on System Structure and Control. A report on this very successful Conference will be published in one of the next issues of the IFAC Newsletter.

IFAC would like to thank AFCET, the French NMO and the local organizers in Nantes for their hospitality and for providing such excellent facilities for holding its meetings.

The Executive Committees, the Executive Board, the Technical Board and the Council held their meetings in Nantes. From the technical point of view IFAC can be proud of a great number of successful events held in the period since the last Council- and Related Meetings. But the Technical Board is taking great care that IFAC stays at the cutting edge of technology by tracking emerging areas and integrating them into IFAC activities. IFAC does not only want to look back on a great past but wants to look forward to a great future as well.

To achieve even better visibility for IFAC a Task Force dealing with Public Relations was established. New ways and improved ways of gaining a higher awareness level in the interested public, especially in industry, will be sought.

The IPC of the next World Congress in Beijing held its meeting, and the IPC Chairman reported that more than 2000 papers were submitted and have already been distributed for reviewing. Both the technical and the non-technical arrangements for the Congress are well under way (cf. information provided in the June issue of the IFAC Newsletter and below in this issue).

Publications are always a matter of consideration at the Council- and Related Meetings. The overall picture in the publications sector is good. The IFAC Publisher and IFAC as such are taking great care to look at new forms of electronic publications and multimedia possibilities to see if they are useful for control community.

At the Council meeting a vote was taken on the Congress venue for 2008. All applications received were of excellent quality which made it very difficult to take a decision. In a vote the NMO of Korea was awarded the Congress for 2008.

Gusztav Hencsey, IFAC Secretary

14th IFAC World Congress Financial Aid Application

The 14th IFAC World Congress will be held in Beijing during July 5-9,1999. Limited funds will be available from a few foundations to assist a small number of authors who would not otherwise be able to attend the Congress. Applications are restricted to authors from developing countries which are National Member Organizations of IFAC. The application should include:

1. Name;

2. Title, affiliation, full address(including mailing address, Phone and Fax numbers and e-mail address);

3. Paper number, title, author(s), and abstract of the paper submitted, and suggested symposium and technical areas;

4. A short statement of about 200 words justifying the need for financial aid.

Please send your application via post mail, Fax or E-mail to:

Contact person: Prof. Ying-Ping ZHENG

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Applications must be received by October 31, 1998, and electronic submissions are strongly encouraged.

The Financial Aid Awards will be based on the acceptance of the papers, review ratings, and the proven need, and are limited to one author per paper. The selection will be made by the Financial Aid Subcommittee. Notification of award including the amount and the supporting categories will be made in December 1998.

IFAC'99 National Organizing Committee

Supplemental Ways for Improving International Stability – SWIIS 98
IFAC Conference
Sinaia, Romania, May 14–16, 1998

SWIIS'98 was held in Sinaia (Ro) May 14-16, 1998. It was the 7th in the triennial cycle and sponsored by the TC on SWIIS.

38 participants from 14 countries listened to 2 survey papers and 21 technical papers. The 1st survey paper was presented by F.Kile (USA) and discussed the political and social factors which have driven leadership in the past. The paper suggested that leadership in the future must include sustainability as one of the driving factors.

The Democratic People's Republic of Korea has concentrated on national self-sufficiency for five decades. Its quest for nuclear energy in the 1980s led to a conflict with the United Nations - now slowly resolving itself. This was pointed out by J.Richardson in the 2nd survey paper.

The 21 technical papers were arranged under topics such as: Methodologies, Stability, Modelling and International Policy Cooperation. The Methodology papers dealt with decision making in a reconfigured multipolar world. Issues included were, among others, decision making and the analysis of social interactions. Stability was scheduled under the headlines of economics, cooperation and social restructuring following the dissolution of the centrally planned economies. Modelling sessions were chaired by J. Holubiec (PL) and focussed on cumulative games, prediction techniques and as a new topic "Virtual Society". The policy cooperation was described in terms of macroeconomic models as well as linear programming.

The conference was very well organized by the Romanian NMO in an atmosphere which stimulated intensive and successful discussions. The next event will be in 2001.

I. Dumitrache
NOC Chair

F. Kile
IPC Chair

Intelligent Assembly and Disassembly – IAD '98
IFAC Workshop
Bled, Sloverna, May 21–23, 1998

This first Workshop in this rapidly growing field was organized by the „Laboratory for Handling and Assembly", Faculty of Mechanical Engineering, University Ljubljana, in cooperation with the Institute of Handling Devices and Robotics", Vienna University of Technology. The 50 participants had the possibility to attend 3 plenary sessions, 9 technical sessions with 28 papers and a round table discussion.

In the first plenary session Feldmann et al. described innovative disassembly strategies based on flexible partial destructive tools. After an analysis of the characteristics of disassembly, an approach for computer aided disassembly planning as well as some innovative tools were presented. D. Noe tried to give an overview on sensors necessary for intelligent assembly and disassembly. A special field of disassembly – disassembly of electronic equipment – was discussed by Kopacek et al in their survey paper.

The technical papers arranged in 9 sessions covered the whole field of assembly and disassembly. Starting with Planning Systems and Methods via Petri Nets, Fuzzy and Neural Networks, Logistics, Robot Vision until Components and Systems

The main results also from the round table were: Assembly is an established field and nearly all problems can be solved - implementation is only a question of economics. Disassembly is a rapidly growing field of automation with several as yet unsolved problems.

The Workshop was extremely well organized and the atmosphere of Bled stimulated the „IAD-family" to exchange ideas and discuss problems. Because of the importance of this subject it was decided to have the next event on this topic in the year 2000.

Dragica Noe
NOC Chair

Peter Kopacek
IPC Chair

demic researchers can solve (Technology Push) and what industrial practitioners need to be solved (Technology Pull). The industrial plenary that took place on the second day of the conference with two industrial speakers from DuPont (USA) and Mitsubishi Chemicals (Japan) was an excellent mechanism for industry to define the unsolved technical problems that need to be addressed by academic researchers in the near future.

The record number of paper submissions afforded the IPC to be very selective about the papers that were accepted for presentation. Only 70% of the papers submitted were accepted for either oral of poster presentations, which represents a very substantial rejection rate. The conference program included four parallel tracks, instead of the previously used three tracks. This was due to three reasons: 1) The inclusion in the DYCOPS program of the workshop on the Integration of Design and Control. This workshop was initially planed to take place in Israel. 2) The record number of paper submissions which were judged by the reviewers to be of excellent quality, and 3) The short daily schedule used (9:00-16:00) due to the substantial cultural activities and the temperature constraints imposed by the weather.

Based on the comments that many participants made, it is believed that the conference was very successful. Here are the comments made by some of the most prominent participants.

- "The best conference in my last 30 years" (Prof. Dale Seborg, Santa Barbara)

- "Just a short note to express my gratitude for the opportunity to be part of the most successful conference that I have attended" (Prof. George Stephanopoulos, MIT)

- "Congratulations on organizing a very successful and memorable conference ... You guys did a terrific job. You have set new standards for conferences that will be hard to beat". (Prof. Sirish L. Shah, U. of Alberta)

- "I wanted to congratulate you on a splendidly organized DYCOPS Conference" (Prof. Manfred Morari, ETH)

New Features Tested

Possibly for the first time at an IFAC meeting, certainly in the area of Process Control, the majority of the paper submission and review process were done electronically. The majority of the papers was submitted via FTP to the server at the Chemical Process Modeling and Control Research Center at Lehigh University. Additional papers were submitted via electronic mail and only a handful by the old-fashioned paper format. The majority of the papers were distributed electronically to the reviewers. The IPC co-chairs had access to all the papers electronically in the FTP server. The majority of the reviews were submitted via Web forms and then transferred into a data-base file. Some of the reviews were submitted via fax and they were inputted in the data-base by the local staff. The review forms were sent to the IPC co-chairs electronically and the responses to the authors were generated through the data-base file and mailed out via PostScript forms.

Journal Publication of Papers

Plans have been made to publish a select group of the papers in a special issue of the Journal of Process Control. These plans have been coordinated with the editors of Automatica and Journal of Control Engineering Practice.

Christos Georgakis
IPC Chair

Dynamics and Control of Process Systems – DYCOPS 5
IFAC Symposium
Corfu, Greece, June 8 – 10, 1998

Methods and Statistics of paper Selection:

The International Program Committee (IPC) decided to skip the submission and review of abstracts. Consequently, the full papers (each six pages long) were submitted in September of 1997. The number of submissions was 157, a record number and an increase of about 35-40% from the number of paper that were submitted in the previous conference of this series, in Denmark in 1995. All of the submitted papers were sent out to three reviewers each. About 75 reviewers were used, selected from the IPC members and the submitting authors. Each paper received at least two reviews and the average number of reviews per paper equaled 2.5. The papers and their reviews were distributed to the 5 IPC co-chairs who made the preliminary paper selection. They forwarded their recommended action to the IPC chair, who made the final paper selection. The IPC Chair also

arranged the papers in homogeneous sessions and put together the final program. Of the submitted 157 papers only 84 (54%) were selected for oral presentation and 26 for poster presentation (17%). Of the reviewed papers three were selected as the best submitted papers and were presented as keynote papers. Nine additional keynote papers were invited for presentation to the conference by the IPC chair. The conference also included two plenary papers and an additional plenary session that involved presentations from industrial research managers.

Program Summary and Discussion

The technical theme of the conference was "Technology Push versus Technology Pull in the 21st Century". The conference theme aimed to attract an increased number of industrial papers and participants and to open the dialog between what academic

Control Applications in Post-harvest and Processing Technology (CAPPT'98)
IFAC/ISHS/CIGR EURAGENG
International Workshop
Budapest, Hungary, June 3-5, 1998

Opening Ceremony of CAPPT '98
From left to right: Prof. L. Keviczky, Prof. I. Farkas, Prof. Y. Hashimoto

The aim of the CAPPT'98 Workshop was to provide a forum for presentation and discussion of recent advances on control applications in post-harvest and processing technology. The IFAC Workshop was co-sponsored by the IFAC Technical Committees on "Modelling and Control in Agricultural Processes" and "Intelligent Control in Agricultural Automation". The Workshop was locally organised by the Department of Physics and Process Control, Gödöllő University of Agricultural Sciences (GUAS) and the Process Control Research Group, Hungarian Academy of Sciences - HAS. The sponsors were the International Society of Horticultural Sciences (ISHS), the International Commission of Agricultural Engineering (CIGR), the European Society of Agricultural Engineers (EurAgEng), Gödöllő University of Agricultural Sciences, Hungarian Academy of Sciences and the National Committee for Technological Development, Hungary. The venue of the Workshop was the Hotel Ében in Budapest and also the Campus of the Gödöllő University of Agricultural Sciences.

Following the Call for Papers 42 abstracts were received. Finally 35 papers were selected from 12 countries into seven sessions as Mathematical Modelling; Control Aspects; Decision Support; Observation for Control; Property Measurements; Fruit Quality Measurements; Heat and Mass Transfer. A Preprints volume of 176 pages including 34 papers was published and distributed during the Workshop.

The international character of the meeting can be seen from the list of countries from which the participants came as follows: China (1), Germany

(2), Greece (2), Israel (2), Japan (8), Hungary (25), Norway (2), Pakistan (1), Poland (1), Portugal (2), Syria (1), The Netherlands (3), Turkey (1), United Kingdom (1), Yugoslavia (1). Among the participants there were 9 women.

In the opening ceremony Prof. I. Farkas (Workshop Chairman), Prof. L. Keviczky (IFAC Council representative, Secretary General of the Hungarian Academy of Sciences), Prof. Y. Hashimoto (IFAC CC Chairman) said greeting words. On the second day of the Workshop, at the Gödöllő University of Agricultural Sciences Prof. Cs. Székely (Rector), Prof. Zs. Szüle (on behalf of Dean of Faculty of Agricultural Engineering) welcomed the participants on behalf of the University.

Finally, in the sessions of the Workshop there were 31 high quality papers presented by authors from 12 countries. 12 papers were selected to be suggested for publication in the IFAC affiliated journals. A consideration was made to publish 12 papers in a special issue of the COMPAG Journal.

During the Workshop there were several social events, such as a Welcome Reception, a visit to the Grassalkovich Castle (Mansion of the Royal Family) in Gödöllő and a Banquet at a Hungarian-style restaurant ("Csárda").

The Third CAPPT'2001 Workshop will be held in Tokyo, Japan in 2001 under the chairmanship of Prof. S. Oshita.

Prof. I. Farkas, IPC Chair   A. Biró, NOC Chair

Control Engineering Practice
Volume 6, No 4, May 1998

Preview

Joint Diagnosis of Process and Sensor Faults Using Principal Components Analysis
(R. Dunia and S.J. Qin)
A PID Approach to Suppressing Stick-slip in the Positioning of Transmission Mechanisms
(Chi-Cheng Cheng and Cheng-Yi Chen)
Error Analysis for Four-axis Side Milling of Undevelopable Ruled Surfaces
(Bo Yang, Ming C. Leu and Ji Zhou)
Methodology for a Physico-economic Product Evaluation, Starting in the Design Phase
(D. Raviart, O. Sénéchal and C. Tahon)

Preface to the Special Section on Computer Aided Control Systems Design
(L. Boullart and M. Loccufier)
Physical System Modelling with Modelica
(S.E. Mattsson, H. Elmqvist and M. Otter)
A Hybrid Modelling and Verification Paradigm for Embedded Control Systems
(P.J. Mosterman, G. Biswas and J. Sztipanovits)
Using Genetic Algorithms to Design a Control Strategy of an Industrial Process
(S. Sette, L. Boullart and L. Van Langenhove)
An Integrated Approach to Rapid Product Development for Automotive Embedded Control Systems
(U. Lefarth, U. Baum, T. Beck, K. Werther and T. Zurawka)
Applying Load Adaptive Real-time Algorithms to a Vehicle Control System
(J. Pfefferl and G. Färber)
Implementation Aspects of the PLC Standard IEC 1131-3
(M. Öhman, S. Johansson and K.E. Arzén)

IFAC Meeting Papers – Keyword Listing
System Identification (SYSID'97), July 1997, Fukuoka, Japan
Intelligent Components and Instruments for Control Applications, June 1997, Annecy, France

Index of IFAC Meeting Papers
Conference Calendar

On-line Fault Detection and Supervision in the Chemical Process Industries
3rd IFAC Workshop
Solaize, France, June 4–5, 1998

In continuing the tradition of the last two workshops held in 1992 at the University of Delaware and in 1995 at the University of Newcastle, this workshop, chaired by Professor Prasad Dhurjati, sponsored by the IFAC Technical Committee on "Chemical Process Control", and co-sponsored by the IFAC Technical Committee on "Fault Detection and Supervision of Technical Processes", the IFAC Technical Committee on "Safety of Computer Control Systems", AFIA (French Association of Artificial Intelligence), Elf Aquitaine and Gensym, attracted 100 people from 20 different countries. 110 extended abstracts were submitted and sent for reviews. 46 papers were selected for oral presentations. These full papers were completely reviewed again. The workshop focused on the development and evaluation of methodologies for on-line fault detection, localisation and supervision in the chemical process industries. It addressed theory, application, validation, performance and cost evaluation of methodologies such as parameter estimation, observers, parity equations, signal analysis methods, classification, rule-based systems with probabilistic approaches, fuzzy logic and neural networks. During

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Papers from the July 1998 Issue

Papers

Symmetric Matrix Polynomial Equation: Interpolation Results
(D. Henrion, M. Sebek)
Design of Robust Adaptive Controllers for Nonlinear Systems with Dynamic Uncertainties
(Z.-P. Jiang, L. Praly)
H, Output Feedback Control for Descriptor Systems
(K. Takaba, T. Katayama)
A Multiplier Approach for the Robust Design of Discrete Time Control Systems with Real/Complex Uncertainties
(A. Tchernychev, A. Sideris)
Two-sided Tangential Interpolation with Real Rational Units in H infinite
(R.K. Prasanth)

Brief Papers

Reliable Control of Uncertain Nonlinear Systems
(Y. Liu, J. Wang, G.- H. Yang)
Reliable Control of Uncertain Nonlinear Systems
A Quasi-tracking Approach for Finite-time Control of a Mass-beam System
(G. Zhu, S.S. Ge)
Robustness and Trade-offs in Repetitive Control
(R.C.H. Lee, M.C. Smith)
Global Control of Linear Systems with Saturating Actuators
(Z. Lin)
Stabilization and Tracking via Output Feedback for the Nonlinear Benchmark System
(Z.-P. Jiang, D.J. Hill, Y. Guo)

Technical Communiques

A New Algorithm for Compensator Design for Higher Order System via Reduced Model
(B. Bandyopadhyay, H. Unbehauen, B.M. Patre)
Decay Estimates for Applications of Razumikhin-type Theorems
(C. Hou, J. Qian)

Correspondence

Comments on "Design of Decentralized Control for Symmetrically Interconnected Systems" and Authors' Reply
(J. Hu, M. Aldeen)
Comments on "Design of Decentralized Control for Symmetrically Interconnected Systems"
(S. Huang, S. Zhang)

Papers from the August 1998 Issue

Papers

Formal Verification of Compiler Transformations for Speculative Real-time Execution
(M.F. Younis, G. Tsai, T.J. Marlowe, A.D. Stoyen
Riccati Equations for Strongly Stabilizable Bounded Linear Systems
(J.C. Oostveen, R.F. Curtain)
A New Pattern Recognition Adaptive Controller with Application to HVAC Systems
(J.E. Seems)

Brief Papers

Robust Iterative Learning Control for a Class of Nonlinear Systems
(J.-X. Xu, ZU. Qu)
Exponential Stabilization of a Constrained Bilinear System
(M.-S. Chen)
Some Examples and Remarks on Quasi-static Feedback of Generalized States
(J. Rudolph, E. Delaleau)

Technical Communiques

A Robust Approach to Iterative Learning Control Design for Uncertain Systems
(J.-H. Moon, T.-Y. Doh, M.J. Chung)
On the Robustness of Linear Systems with Nonlinear Uncertain Parameters
(S.J. Xu, M. Darouach)
Optimal Gain and Phase Margin Tuning for PID Controller
(W.K. Ho, K.W. Lim, W. Xu)
An Explicit Formula of Linear Sliding Surfaces for a Class of Uncertain Dynamic Systems with Mismatched Uncertainties
(H.H. Choi)
On the Localization of Intersample Ripples of Linear Systems Controlled by Generalized Sampled-data Hold Functions
(K.G. Arvanitis)

Application of Cyclic Control to a Two-link Flexible Arm
(P. Lucibello, S. Panziero)
Discrete-time Optimal Control with Control-dependent Noise and Generalized Riccati Difference Equations
(A. Beghi, D. D'Alessandro)
On Delay-dependent Stability and Decay Estimate for Uncertain Systems with Time-varying Delay
(Y. Gu, S. Wang, Q. Li, Z. cheng, J. Qian)

Correspondence

Comments on 'Gain Scheduling Dynamic Linear Controllers for a Nonlinear Plant'
(D.J. Leith, W.E. Leithead)
Author's Reply
(D.A. Lawrence)

Intelligent Autonomous Vehicles – IAV '98
IFAC Symposium
Madrid, Spain, 25 – 27 March, 1998

The IAV'98 Madrid Conference was the third of the IFAC-sponsored meetings in the field of Intelligent Autonomous Vehicles. It follows the IAV Conferences held in Espoo (Finland) in 1995 and in Southampton (the United Kingdom) in 1993. The Symposium was sponsored by the IFAC TC on Intelligent Autonomous Vehicles, co-sponsored by the IFAC TCs on Aerospace and Marine Systems, and organized by the Univ. Carlos III de Madrid on behalf of the Spanish NMO of IFAC.

The aim of the Symposium was to present and to discuss research and development work together with the advanced applications in the field of land-based- (in & out-door and underground), marine- (including underwater) and aerospace intelligent autonomous vehicles.

The symposium was very successful in terms of papers submission, with a substantial increment of papers submitted in relation to previous editions of the event. 187 contributions from leading institutions all over the world and covering all aspects of intelligent autonomous vehicles were reviewed. The IPC focus was on technical and scientific excellence and broad coverage of research and application areas. 123 regular papers were finally included in the Preprints. These papers came from 29 countries in 5 continents, making IAV'98 a truly international event.

The success of the July 1997 mission to Mars, with photos of the Sojourner planetary rover opening the TV news and being on the front page of newspapers all around the world, has increased the interest in intelligent autonomous vehicles.

Papers presented at IAV'98 covered multiple types of intelligent autonomous vehicles: road vehicles, indoor vehicles, legged robots, mobile manipulators, wheelchairs, underwater vehicles, ships, helicopters, climbing robots, etc; and multiple applications such as transport, construction, cleaning, integration of disabled and elderly people, agriculture or planetary exploration.

Papers described not only new methods and technologies to solve the classic problems related with intelligent autonomous vehicles like path planning, localization, environment modelling, path following, etc., but also new approaches to their design such as new architectures, topological navigation, self-learning systems, etc.

In addition to the regular sessions, plenary lectures were given by distinguished experts. Dr Hayati talked about the successful mission to Mars in July 1997, and new developments of the Jet Propulsion Laboratory for future projects. Prof. Pascoal made a survey over the state of the art of underwater autonomous vehicles and Dr. Kang presented the land, marine and aerospace intelligent autonomous vehicles developed at Draper Laboratory.

Miguel Angel Salichs
Chairman of the International Program Committee

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the plenary session, Prasad Dhurjati emphasized that there are several trends that make on-line fault detection and supervision especially relevant to industry now. These include increasing emphasis on environment and safety, increasing automation and globalization, pressures for improved productivity and competitiveness. The first invited speaker was Patrick Corsi, in charge of innovative software technologies in the ESPRIT project funded by the Commission of the European Communities. He listed several ESPRIT projects on process supervision (TIGER, PRIDE, MARCK, PRIMA, etc.) and discussed the Fith Framework Programme, 1999-2002 in which those researches will be included in the IST (Information Society Technology) programme. The second invited speaker was Ian Nimmo, manager of the ASM (Abnormal Situation Management) project at Honeywell. He explained the motivation of the project and the global architecture of the AEGIS prototype.
Then, during the two full days of the workshop, 43 papers were presented in two parallel sessions and 25 papers were discussed in poster sessions and flash presentations. There were the following sessions : Trend Analysis, Observers, Applications, Neural Networks and Statistics/Data reconciliation, Qualitative Reasoning, Different Approaches, and Supervision/Control/Alarm . In addition a visit of the IFP facilities (pilot plants, automotive test benches, etc.) was organised just before the workshop. The field has matured and there is now a considerable amount of activity in the domain with many of the papers presented being based on real industrial problems. A large number of methodologies are being used and several papers attempted at combining different approaches. The workshop gave the opportunity for people from different fields to meet and to exchange ideas on techniques and problems encountered in fault diagnosis and process supervision.

Prasad Dhurjati (University of Delaware, IPC Chair)
Sylvie Cauvin (IFP, NOC Chair)