



1993
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April

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News from NMOs

The Institution of Engineers, Australia

The Australian National Member Organization of IFAC is the Institution of Engineers, Australia. The Institution is the largest engineering learned society in Australia, with some 65,000 members. It has its national office in Australia's capital city, Canberra, located in the Australian Capital Territory (ACT).

Within the Institution there are five colleges, these being the Chemical, Civil, Electrical, Mechanical and the just recently formed Biomedical Engineering college. Each college is headed by a board and has national committees. The Electrical College's National Committee on Automation, Control and Instrumentation has a sub-committee for IFAC, headed by Dr. Bob Bitmead. Professor Neville Rees is a member of the national

committee and is the chairman of the Organizing Committee for the 1993 IFAC World Congress in Sydney. The College has two staff members, the Executive Officer, Robert Breen and his secretary, Filomena de Angeli.

As part of its responsibilities the Institution of Engineers produces two newsletters, the 'Electrical College News Update' and the 'ACI Newsletter' for the National Committee on Automation, Control and Instrumentation.

The Conference organizing group is very busy working towards the IFAC World Congress to be held in Sydney in July.

R A Breen, Executive Officer
Electrical College

Adaptive Systems in Control and Signal Processing - ACASP '92 IFAC Symposium Grenoble, France 1-3 July, 1992

More than 200 participants representing 25 countries attended this Symposium. The opening session was chaired by Dr. L. Dugard, chairman of the National Organizing Committee, who welcomed the participants and introduced the various representatives present: Prof. B.D.O. Anderson, President of IFAC, Mr. M. Retourna, Délégué Régional, representing the Centre National de la Recherche Scientifique, Dr. M. Garnier, Vice President of the Institut National Polytechnique de Grenoble, Dr. I.D. Landau, Chairman of the International Program Committee and Dr. J.M. Dion, Head of the Laboratoire d'Automatique de Grenoble. Prof. B.D.O. Anderson and Dr. I.D. Landau then delivered brief talks.

In addition to Adaptive Control and Signal Processing, this Symposium emphasized the area of Intelligent Tuning with a Plenary Talk (K.J. Åström) and two Invited Sessions. Four other Plenary Talks were given by P. Kokotovic and G. Dumont on Adaptive Control and by K. Murano and J. Treichler on Signal Processing. Five Invited Sessions were organized as well as a Panel Discussion on Adaptive Control Versus Robot Control. Twenty contributed sessions provided a good view of the state-of-the-art in Adaptive Systems in Control and Signal Processing from both theoretical and practical points of view. Many aspects were presented and discussed during the parallel sessions (Adaptive Control of Nonlinear Systems, MIMO Systems, Identification, Applications, Design, Theoretical Issues, Multidimensional Signal Processing, etc.)

Dr. L. Dugard
Chairman NOC

Intelligent Manufacturing Systems IFAC Workshop Dearborn, MI, USA 1-2 October, 1992

The first IFAC technical meeting on Intelligent Manufacturing System, held at the Hyatt Regency Hotel, Dearborn, was organized by Oakland University, Rochester, Michigan. The IPC consisted of 51 members, with Professor N.A. Kheir serving as IPC Chairman.

The Workshop was sponsored and co-sponsored respectively by the IFAC TC on Manufacturing Control, the TC on Systems Engineering, the American Automatic Control Council, the American Society of Mechanical Engineers, the IEEE and the Society for Computer Simulation. A half day tutorial was held the day before the Conference by Professor Kusiak, focussing on 'Intelligent Design and Manufacturing'. The 21 sessions, held in three parallel tracks, included 78 presentations, of which four sessions were invited (originally about 125 papers were submitted). Participation at the meeting was 115 persons from 17 countries.

The Technical Program highlighted research results within the following wide range of topics:

- Manufacturing Systems: Perspectives
 - Intelligent Manufacturing Processes
 - Product Design and Concurrent Engineering
 - Control of Manufacturing Systems
 - Intelligent Computer Aided Design
 - Scheduling and Production Management
 - Current Topics in Automated Assembly (invited)
 - Process Planning Systems
 - Intelligent Control of Advanced Material Processes (invited)
 - Application of Global Optimization to Manufacturing Systems (invited)
 - Flexible Manufacturing System
 - Fault Detection, Diagnosis and Recovery
 - Fuzzy Control of Manufacturing Systems (invited)
 - Robotics
 - Quality and Reliability
- N. Kheir, IPC Chairman

Newly Approved Events

Title	Date	Place	Deadlines	Further Information
IFAC Conference Safety of Computer Control SAFECOMP	27 - 29 October 1993	Gdansk Poland	-	Dr. J. Gorski, Faculty of Electronics Technical University of Gdansk PL-80-952 Gdansk, Poland
IFAC Symposium (6th) Computer Aided Design in Control Systems	7 - 9 March 1994	Tucson, AZ USA	July 31 1993	Dr. P. Baltes, EPD, University of Arizona Box 9, Harvill Bldg, Rm 235, Second and Olive Streets, Tucson, AZ 85721, USA
IFAC Symposium Advanced Control of Chemical Processes ADCHEM	25 - 27 May 1994	Kyoto Japan	July 1 1993	Dr. S. Hasebe, Dept. of Chemical Engineering Kyoto University, Kyoto 606-01, Japan
IFAC Workshop Computing in Economics and Finance	8 - 10 June 1994	Amsterdam Netherlands	January 31 1994	Prof. H. Amman, Dept. of Macroeconomics University of Amsterdam, Roeterstraat 11, Rm 911 NL-1018 WB Amsterdam, Netherlands
IFAC Conference Integrated Systems Engineering	27 - 29 September 1994	Baden-Baden Germany	January 15 1994	Mr. H. Wiefels, VDI/VDE GMA Postfach 101 139, Graf Recke Str. 84 D-W-4000 Düsseldorf 1, Germany

Note: IFAC Workshop on Intelligent Manufacturing Systems, Vienna, Austria, June 22-24, 1994: The deadline for this event is **15 February, 1994** and not 1993, as given in the last issue of the Newsletter.

* not known
- past

Distributed Computer Control Systems DCCS 1992 IFAC Workshop Beijing, China, P.R. 23-25 August, 1992

The 11th IFAC Workshop on Distributed Computer Control Systems was organized by the Chinese Association of Automation, sponsored and co-sponsored respectively by the IFAC TCs on Computers and Applications, co-sponsored also by the National Natural Science Foundation of China, the Institute of Automation, the Chinese Academy of Sciences, and the 6th Institute of MMEI, China. About 95 papers had been submitted to the workshop, of which 19 were from out of China. After careful review by the IPC, 42 papers from 11 countries were selected; of those 26 were from China, 16 from abroad. Of the 50 delegates from 6 countries who participated in the Workshop, there were participants from the USA, France, Germany, South Africa and Brazil.

Prof. T.J. Willems from the USA gave a plenary paper with the title 'One View of the Future of Industrial Control', and introduced the distributed control system, multi-level hierarchical control and development of CIMS, etc.

The Technical Session topics included:
DCCS in CIMS
System Architecture of DCCS
Method Analysis & Design DCCS
Protocol Network & Communication System
Field Bus and LAN
Real Time System
Application of DCCS
Software
AI in DCCS

One panel discussion about AI in DCCS was organized. There was a number of technical visits, e.g. to the 6th Institute of MMEI of China, with domestic Chinese workstations, industrial control computers, distributed control systems, monitor and control system of power stations, etc.; to the Tsinghua University with the State CIMS Engineering Research Centre, the CIMS Manufacturing Automation Laboratory, etc. In spite of the small scale of the Workshop and the absence of some IPC members, the aim of the Workshop was achieved. It had a wide scope and the participants showed great interest in discussing papers and in participating in the technical visits.

Gong Bingzheng
NOC Chairman

Real-Time Programming - WRTP '92 18th IFAC/IFIP Workshop Bruges, Belgium, 23-26 June, 1992

The 18th IFAC/IFIP Workshop on Real-Time Programming was organized by the Belgian Institute for Automatic Control (BIRA-IBRA), the National Member Organization of IFAC in Belgium. This Workshop follows a series that began in 1971, and has been sponsored by IFAC and co-sponsored by IFIP since its third meeting in 1974. In 1987, the Working Group on Real-Time Programming was established within the IFAC Technical Committee on Computers in order to ensure continuity and proper guidance in the organization of this series of Workshops. As all IFAC events, WRTP's are international events which are held in different parts of the world twice within every three years. The last meetings were held in Valencia (1988), Berlin (1989) and Atlanta (1991). The next event will be held in Germany in 1994.

After receiving 125 abstracts, the IPC selected 53 qualified papers and scheduled 14 sessions during a 3 1/2 day workshop event in the splendid historic city of Bruges. The program as announced was particularly successful. Some 107 participants from 22 different countries attended the event, which covered different aspects of the Workshop scope.

The keynote session dealt with the general question of 'Time Concepts in Real-Time Software'. Furthermore the following topics were covered in the sessions:

- Real-time system specification;
- Real-time languages and tools;
- Real-time operating systems, kernels and communications;
- Real-time simulation and education;
- Real-time evaluation and benchmarking;
- Real-time scheduling.

The scope of the IFAC Working Group on Real-Time Programming - and the Workshop series - is about engineering aspects of software for real-time systems, especially computer and control systems. Particular areas of interest include specification and design methods for real-time systems, languages for real-time programming, real-time operating systems, as well as the impact of all these topics on continuous and discrete process control applications. In recent years, there has been an increasing interest in all the aspects of real-time computing.

The growing success of this series of Workshops was clearly reflected in the great number and high quality of the papers which were presented at WRTP '92. In the coming Control Engineering Practice Journal issue, a selection of the most interesting and novel papers will be published.

L. Boullart, NOC Chairman
J.A. de la Puente, IPC Chairman

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Control Engineering Practice

Volume 1 Number 2
April 1993

Preview

Papers from the IFAC Symposium on Artificial Intelligence in Real-Time Control, June 1992
(Guest Editors: H.B. Verbruggen and M.G. Rodd)

Preface to the Papers from the 1992 IFAC Symposium on Artificial Intelligence in Real-Time Control

(H.B. Verbruggen and M.G. Rodd)

Autonomous Controllers

(K.J. Aström)

Towards Intelligent Control of Mechanical Processes

(R. Isermann)

Applications of Qualitative Model-Based Reasoning

(J.E. Hung, M.H. Lee and C.J. Price)

Applications of Fuzzy Logic in the Control of Polymerization Reactors

(B. Roffel and P.A. Chin)

A Fuzzy Logic Application in Phosphoric Acid Production

(M. Ketonen)

A Method of Inducing Fuzzy Rules and Membership Functions

(K. Kobayashi, H. Ogata and R. Murai)

Contribution of Fuzzy Logic Control to the Improvement of Modern Car Performances

(S. Boverie, B. Demaya, J.M. Le Quellec and A. Titi)

The Application of Artificial Neural Networks to Non-Intrusive Multi-Phasing Metering

(C.P. Sheppard and D. Russel)

Neural-Net Computing for Real-Time Control of a Ship's Dynamic Positioning at Sea

(Mao Yang Gu, Yoh-Han Pao and P.P.C. Yip)

BIOTECH: A Real-Time Application of Artificial Intelligence for Fermentation Processes

(J.P. Steyer, I. Queinnec and D. Simoes)

FORMENTOR: A Real-Time Expert System for Risk Prevention in Complex Hazardous Environments: A Case Study

(M. Wilikens, J.P. Nordwik and A. Poucet)

Development of a Real-Time Expert System for Wastewater Treatment Plants Control

(P. Serra, J. Lafuente, R. Moreno, C. de Prada and M. Poch)

TDC 3000 Expert in Refineries: Application on a Desalting Unit

(B. Delaunoy, M. Dumont, M. Mertens, E. Dufour and H. Gilles)

Papers from the IFAC Workshop on System Structure and Control, September 1992
(Guest Editor: V. Strejc)

Preface to the Papers from the 2nd Workshop on System Structure and Control

(V. Strejc)

Loop Shaping H_{∞} Design: Application to the Robust Stabilization of a Helicopter

(S. Mammari and G. Duc)

Eigenstructure Approximations and Their Use for a Commutative Controller Strategy: Application to a Helicopter

(Y. Asian, D. Beauvois and J.A. Rossiter)

Multivariable Adaptive Control for the Design of STT Missile Autopilots

(P. Bendotti and M. M'Saad)

The Effect of the Heat Exchanger Network Topology on the Network Control Properties

(E.I. Varga and K.M. Hangos)

Easy Design of Deadbeat Control Using Plant Step Response Only

(J. Marsik, P. Klán and V. Strejc)

Abstracts

IFAC Workshop: Systems Structure and Control, Prague, Czech Republic, September 1992

IFAC Symposium: Safety of Computer Control Systems, Zurich, Switzerland, October 1992

IFAC Workshop: Intelligent Manufacturing Systems, Dearborn, Michigan, USA, October 1992

Conference Calendar

Mutual Impact of Computing Power and Control Theory

IFAC Workshop

Prague, Czechoslovakia

1-2 September, 1992

The key idea in the organization of this Workshop was to address the discrepancy which exists between available computer power and exploitable algorithms obtained classically from Control Theory. The Workshop was therefore fairly broad in scope, and this broadness was duly reflected in the range of papers accepted. Host for the Workshop was the Institute of Information Theory and Automation, Prague, and this proved to be an excellent choice of venue, largely because of the Institute's position at the forefront of the field.

Papers were invited for the Workshop with an aim to address issues such as Intelligent Control, Neural Networks, Robust Techniques, System Identification, Adaptive Control, Signal Processing and Modelling. The papers presented indicated a good spread across the topic areas and also a good range of international participants. A total of 62 papers was submitted, with the final selection being made on a full paper basis, and this resulted in an attendance of 73 with 27 papers being presented. 19 countries were represented at the Workshop, including the USA, Japan, Italy, the UK and Sweden as well as Czechoslovakia.

Because of the stringent method applied to paper selection, it is difficult to pick out particular highlights from those presented, however, the following are especially noteworthy:

1. Upcoming Numerical Linear Algebra Issues in Systems and Control Theory, by Paul van Dooren (USA)
2. Computational Aspects in Adaptive Control, by Björn Wittenmark (Sweden)
3. On the Design of Approximate Finite-Dimensional Estimators: The Bayesian View, by Rudolf Kulhavy, Czechoslovakia
4. Complexity of Dynamic Models for Intelligent Control, by Katalin Hangos (Hungary)

P. Warwick, IPC Chairman

M. Kárny, NOC Chairman

System Structure and Control

2nd IFAC Workshop

Prague, Czechoslovakia

3 - 5 September, 1992

The Workshop was sponsored by the IFAC Technical Committee on Theory. It was organized by the Institute of Information Theory and Automation of the Czechoslovak Academy of Sciences. It was held in the Forum Hotel, Prague, Czechoslovakia.

The Workshop was attended by 146 participants from 26 countries. V. Kucera, Chairman of the IPC, welcomed the delegates on behalf of IFAC, and presented the highlights of the Technical Program.

The aim of the Workshop was to bring together specialists on both linear and nonlinear control systems theory to discuss new trends and mutual impacts of various research fields. The topics included linear systems, polynomial equations, nonlinear systems, chaotic systems, implicit systems, n-D systems and filters, H-infinity control, robust control, applications and software.

The Technical Program was composed of 58 invited, 74 contributed and 3 tutorial papers, presented in 8 invited, 2 regular and 6 poster sessions. The papers were selected from 184 abstracts submitted to and reviewed by the members of the IPC. The social program included an informal evening meeting at a traditional Czech restaurant located on a marvellous historical square in the center of Prague.

The 2nd IFAC Workshop on System Structure and Control continued a good tradition of the previous meeting. It was one of the first within IFAC that included also a special session on chaotic systems control. The Workshop Preprints Volume was published by Pergamon Press and includes 125 high quality papers.

S. Celikovský

NOC Chairman

Confirmation of Affiliate Membership Newsletter Survey

By returning this questionnaire, your Affiliate Membership and thus all related benefits such as free subscription to IFAC Newsletter, reduced Affiliate subscription rate to the journals AUTOMATICA and *Control Engineering Practice* will be confirmed.

We therefore ask you to fill in this questionnaire, complete with all your particulars, and return it to

IFAC Secretariat

Schlossplatz 12

A-2361 Laxenburg

Austria

Non-reply by June 30, 1993 will be considered discontinuation of Affiliate Membership.

Thank you for your cooperation

Please print

Title: _____ First Name: _____ Surname: _____

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e-mail: _____

Date: _____ Signature: _____

Papers From the Next Issue – May 1993

Editorial

On to New Horizons
(G.S. Axelby)

Papers

A Suitable Generalized Predictive Adaptive Controller Case Study: Control of a Flexible Arm (M. M'Saad, L. Dugard, Sh. Hammad)
Composite Adaptive Control of Flexible Joint Robots (J. Yuan)
Torque Regulation of Induction Motors (R. Ortega, G. Espinosa)
Interactor Structure Estimation for Adaptive Control of Discrete-Time Multivariable Nondecouplable Systems (Y. Mutoh, R. Ortega)
Subspace Algorithms for the Stochastic Identification Problem (P. Van Overschee, B. de Moor)
Robust Filtering and Feedforward Control Based on Probabilistic Descriptions of Model Errors (M. Sternad, A. Ahlén)
Robust Stabilization - BIBO Stability, Distance Notions and Robustness Optimization (P.M. Mäkilä, J.R. Partington)
Duality Theory of Robust Disturbance Attenuation (J.G. Owen, G. Zames)
An Overview of Extremal Properties for Robust Control of Interval Plants (M. Dahleh, A. Tesi, A. Vicino)
On the Gap Metric and Coprime Factor Perturbations (J.A. Sefton, R.J. Ober)
Block Decoupling with Stability by Unity Output Feedback - Solution and Performance Limitations (A. Linnemann, Q-G. Wang)

Brief Papers

Decomposition Approach to the Public Transport Scheduling Problem (W. Grega)
On the Nonlinear Optimal Regulator Problem (C.J. Goh)
Robust Control for Servo-Mechanisms under Inexact Friction Compensation (C.C. de Wit)
Algebraic Analysis of Absolute Stability for Uncertain Dynamical Systems with Nonlinear Time-Varying Properties (I.B. Junger, O.I. Gerasimov)
Controller Design Oriented Model Identification Method for Hammerstein System (Z-Q. Lang)
A Riccati Equation Approach to the Singular LQG Problem (Y. Halevi, W.M. Haddad, D. Bernstein)
Block Diagonally Dominant Positive Definite Approximate Filters and Smoothers (K.S. Riedel)
Covariance Controllers: A New Parametrization of the Class of All Stabilizing Controllers (K. Yasuda, R.E. Skelton, K. Grigoriadis)

Book Reviews

On-Line Estimation and Adaptive Control of Bioreactors Process Measurement & Control I, by G. Bastin & D. Dochain (J.P. Babary)
Adaptive Optimal Control, The Thinking Man's GPC, by R. Bitmead, M. Gevers, V. Wertz (L. Ricker)
Adaptive Control Stability, Convergence and Robustness, by S. Sastry, M. Bodson (B. Egardt)
Modern Signals and Systems, by H. Kwakernaak and R. Sivan (M. Green)
Stochastic Versus Fuzzy Approaches to Multiobjective Mathematical Programming under Uncertainty, by R. Slowinsky & J. Teghem (P. Kloeden)
Hierarchical Multiobjective Analysis of Large-Scale Systems, by Y. Haimes, K. Tarvainen, T. Shima & J. Thadattil (M.G. Singh)
Linear Controller Design Limits of Performance (I.I. Mareels)

WHO IS WHO IN IFAC



Professor Rob Evans
Vice-Chairman, TC on Systems Engineering
Co-IPC Chairman, Sydney World Congress

Rob Evans was born in Melbourne, Australia, in 1947. After completing a BE degree in Electrical Engineering at the University of Melbourne in 1969, he spent 5 years as an engineering officer with the Royal Australian Airforce, working in the area of radar systems.

He completed a PhD in Electrical Engineering at the University of Newcastle in 1975, and then undertook postdoctoral studies at the Laboratory for Information and Decision Systems, MIT, USA, and the Control and Management Department, Cambridge University, UK.

In 1977 he returned to Australia to take up an academic position at the University of Newcastle, where he was head of the Department of Electrical and Computer Engineering from 1986 - 1991, and Co-Director of the Centre for Industrial Control Sciences, between 1988 and 1991.

In 1992 he moved to the University of Melbourne, where he is now Head of the Department of Electrical and Electronic Engineering and Research Leader for the Cooperative Centre for Sensor Signal and Information Processing.

During the past 15 years, he has been heavily involved with industry in many substantial engineering projects. These have included the design of specialized microprocessor based instruments for control and signal processing, the design and implementation of computer control systems for large high accuracy satellite and star tracking antennae, the design of fault-tolerant multiprocessor distributed SCADA systems, and the design of high performance variable speed AC drives. He is currently working with industry on the design of target tracking algorithms for use with over-the-horizon radar systems.

His research has ranged across many areas, and he is author or co-author of around 150 published papers in the area of control theory, radar systems, signal processing, and computer systems. He is a Fellow of the Institution of Engineers, Australia, and Fellow of the Australian Academy of Technological Sciences.

In IFAC, Rob Evans currently holds the position of Vice-Chairman of the Technical Committee on Systems Engineering. He is one of the Co-Chairmen of the International Program Committee for the IFAC World Congress in Sydney.

To help us evaluate and even improve our services, kindly fill in the questionnaire below

	1	2	3	4
Benefits derived from Affiliate Membership	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Information on IFAC events	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Newsletter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(1 - excellent, 2 - good, 3 - satisfactory 4 - not satisfactory)

Suggestions and comments: _____
