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Newly Approved Events

New IFAC Titles from Pergamon (An Imprint of Elsevier Science)

Fault Detection, Supervision and Safety for Technical Processes 1994

A Postprint Volume from the IFAC Symposium, Espoo, Finland, 13 - 16 June, 1994

Edited by T. Ruokonen, IVO Generation Services Ltd, Helsinki, Finland

Fault detection, supervision and safety are an essential part of modern control engineering. In this publication, over two hundred experts from various fields and application areas present their latest results on reliability, availability and safety of technical processes, discussing both theoretical and practical problems. Applications in all phases are covered, from design, start-up, operation, maintenance through to repair. Relevant methods and tools for monitoring, diagnosis and detection are discussed as well as the increasingly important topics of failure data collection and analysis, human factors and man-machine interfaces. This volume lays strong emphasis on applications and aims to promote further research and industrial cooperation. *Audience: For researchers and engineers in manufacturing, control technology, technical process safety and systems design.*

1994 792 pages
ISBN 0-08-042222-5 Paperback Publication: October 1994
Price £ 66.00 (US\$ 105.00)

Integration of Process Design and Control

A Postprint Volume from the IFAC Workshop, Baltimore, Maryland, USA, 27 - 28 June, 1994
Edited by E. Zafiriou, University of Maryland, Department of Chemical Engineering and Institute for Systems Research, College Park, Maryland, USA.

The existence of interactions between the design of a process and that of its control system has been known to industrial practitioners for a long time. In the past decade academic research has produced methodologies and tools that begin to address the issue of designing processes that are flexible, can be controlled reliably, and are inherently safe. This publication unites the work of academics and practitioners with interests in the integration of process design and control, in order to examine the state of the art in methodologies and applications. The scope covers the design of chemical plants at different stages of detail. It also examines control issues from the plantwide level, where, for example, recycles between units can be important, to the specific unit level, where the availability or selection of measurements might be the most important factor.

Audience: For academics and practitioners in process engineering, control engineering and chemical engineering.

1994 260 pages
ISBN 0-08-042358-2-Paperback Publication: October 1994
Price: £ 45.00 (US\$ 72.00)

Modeling and Control in Biomedical Systems

A Postprint Volume from the IFAC Symposium, Galveston, Texas, USA, 27 - 30 March 1994
Edited by B.W. Patterson, University of Texas Medical Branch and Shriners Burns Institute, Galveston, Texas, USA

Contains 200 papers and posters presented at the IFAC Symposium on Modeling and Control of Biomedical Systems held in Galveston, Texas, 27 - 30 March 1994. Coverage includes: Biomedical signals and systems; the cardiovascular system; cellular and molecular systems; critical care; kinetic modeling; metabolism; models and techniques; musculoskeletal systems; neurosystems; and respiration.

Audience: For all those interested in modeling and control and its applications in medicine.

1994 596 pages
ISBN 0-08-042224-1 Paperback Publication: June 1994
Price: £ 58.00 (US\$ 93.00)

Intelligent Components and Instruments for Control Applications 1994

A Postprint Volume from the IFAC Symposium, Budapest, Hungary, 8 - 10 June, 1994
Edited by Cs. Bányász, Hungarian Academy of Sciences, Computer and Automation Research Institute, Budapest, Hungary

Advances in computer technology and sensor development have led to increasingly successful control operations. In order to maximise future potential it is vital for academics and practitioners in the field to have an international forum for discussion and evaluation of the latest developments. The IFAC Symposia on intelligent components and instruments provide this opportunity and the latest in the series gives rise to this invaluable publication which provides an authoritative assessment of the present state and future directions of these key technologies.

Audience: For engineers and researchers in the fields of industrial process control, intelligent automation and instrumentation.

1994 412 pages
ISBN 0-08-042234-9 Paperback Publication: September 1994
Price £ 51.00 (US\$ 82.00)

Real Time Programming 1994

A Postprint Volume from the IFAC Workshop, Lake Constance, Germany, 22 - 24 June 1994 Edited by W.A. Halang, Fernuniversität, Faculty of Electrical Engineering, Hagen, Germany

In recent years the interest in all aspects of real-time computing has increased significantly. This is not only due to accelerated research efforts undertaken in this area, but also due to an expanding worldwide market for various types of real time computing systems.

This publication brings together the state of the art research from around the world, which makes a significant contribution to the current analysis and future development of this key subject. Sections covering distributed systems, scheduling, verification and validation concepts and architecture, operating systems and software development, ensure that all major aspects are fully represented.

Audience: For control engineers, software engineers and developers, systems specialists, scientific researchers in this area.

1994 202 pages ISBN 0-08-042372-8 Paperback Publication: October 1994 Price: £43.00 (US\$69.00)

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IFIP Secretariat Moves to Laxenburg

It is our pleasure to report that the International Federation of Information Processing has transferred its Secretariat to Austria and is now located in the immediate vicinity of the IFAC Secretariat. This once again proves that Austria is an ideal location for administrative offices of international organizations. Apart from accommodating the IFAC Secretariat and now also the IFIP Secretariat, Laxenburg (20 km South of Vienna) has been the long-time home of the IIASA (International Institute of Applied Systems Analysis).

Mr. Plamen Nedkov (BG) is the successor of Mrs. Gwyneth Roberts, who will retire as Administrative Manager of IFIP on 31 March 1995. Mr. Nedkov has been with IFIP since 1984 when he was responsible for arranging the General Assembly Meeting in Varna, Bulgaria.

In 1994, prior to the move of the IFIP Secretariat from Geneva, Switzerland, to Laxenburg, Austria, he was chosen as Administration Manager of the Laxenburg Secretariat. A primary concern of the IFIP Secretariat in Laxenburg will be to maintain efficient communication and information channels to serve the IFIP community at large.

IFAC and the IFAC Secretariat in Laxenburg are very happy about having the IFIP Secretariat in its immediate neighbourhood and the best wishes of all members of the IFAC Secretariat staff accompany this move.

Council- and Related Meetings Sun City, South Africa 25 - 28 August, 1995

The South African Council of Automatic Control, SACAC - the South African NMO of IFAC - has invited IFAC to hold its annual Council - and Related Meetings in Sun City, in conjunction with the IFAC Symposium on Mining, Mineral and Metal Processing, scheduled to take place from 29 - 31 August, 1995. IFAC is very grateful for the invitation, and at the same time pleased that the IFAC Council can be convened on the African continent for the first time. There will most certainly be the opportunity to meet representatives of automatic control organizations from other African countries. We hope that these contacts will stimulate the development of automatic control in these countries to the point where IFAC will be able to welcome more National Member Organizations from Africa.

In addition to these contacts, the IFAC Council- and Related Meetings will in part be a preparation for the next World Congress, to be held in San Francisco in 1996. This means that the San Francisco Congress IPC will hold a meeting in Sun City, in addition to the technical and administrative meetings that usually take place.

More detailed information on the meetings will be published in the next issue of the IFAC Newsletter.

Mathematical and Control Applications in Agriculture and Horticulture

IFAC/ISHS Workshop Silsoe, UK, 9 - 12 September, 1994

This was the second Workshop in a series established by the Technical Committee on Control in Agriculture. The first, in Matsuyama, Japan in 1991, was the initial meeting organized by this newly formed group and showed the wide range of issues and interest that could be expected from the agricultural sector. This second Workshop, again cosponsored by the International Society for Horticultural Science, showed that the faith of the TC Chairman, Professor Y. Hashimoto, in the viability of this group was well-founded. The 60 place limit, set to ensure a fully interactive workshop atmosphere, was always under pressure, and a number of latecomers were unfortunately disappointed. Luckily the momentum of this technical committee is now sufficient to have spawned a series of other workshops in the coming years, with scope to accommodate all interests.

processes and inferring the course of important variables that cannot be directly observed. However, translation into control will require careful attention to model reduction or system identification approaches that can benefit from simulation information. Future advances in control practice will require further attention to this area.

The Workshop was held in the Mansion at Wrest Park, Silsoe, and participants enjoyed the elegant surroundings of the building and its gardens. All expressed themselves satisfied with an enjoyable and successful meeting - we look forward to the next one in this series.

Bill Day NOC Chairman

The delegates from 14 countries heard five keynote papers, 21 other talks and had ample time to read and discuss 27 poster presentations. In addition there was the opportunity to see ongoing research at Silsoe Research Institute in the area of modelling and control. The papers spanned environmental control (e.g. in greenhouses and livestock buildings), image analysis of biological objects, control of field machines and processes, robotics and post harvest treatment of crop produce. Many themes were the subject of extensive discussion during the meeting. Of major importance were the relevance to control of mechanistic models of processes, and the limited extent to which current studies have led to practical advances in control practice. It was generally agreed that mechanistic models would continue to be important in defining the framework of complex

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.

**Control Engineering
Practice**
Volume 3, Number 3
March 1995

Preview:

Position Control for a Subsea Pump System Driven by a Linear Motor
(T.X. Mei and R.M. Goodall)
Experimental Results in a Model Reference Adaptive Estimation and Control of a Fermentation Process
(M. Maher, B. Dahhou and F.Y. Zeng)
The Implementation of Fixed Rulebase Fuzzy Logic to the Control of Small Surface Ships
(M.N. Polkinghorne, G.N. Roberts, R.S. Burns and D. Winwood)
Tracked Mobile Robot Control: Hybrid Approach
(Zhejun Fan, Y. Koren and D. Wehe)
A Comparison of Interconnection Methods for Multi-Robot Systems
(K.D. Lee, B.H. Lee and M.S. Ko)
Open Environments and Object-Oriented Methods for Computer-Aided Control System Design
(H.A. Barker)
Low-Cost Steam Consumption Control System for Batch Pulp Cooking
(J. Petrovic, N. Hvala, A. Bitenc and S. Strmenik)
Design of Robust Control Systems with Time-Domain Specifications
(S. Engell)

Papers from the IFAC Symposium on Advanced Control of Chemical Processes, Kyoto, Japan, May 1994
(Guest Editor: D. Bonvin)

Preface to the Papers from the IFAC Symposium on Advanced Control of Chemical Processes (ADCHEM '94)
(D. Bonvin)
Identification of Combined Physical and Empirical Models Using Nonlinear *A Priori* Knowledge
Override Configuration of Generalized Predictive Control for a Multi-Purpose Control Problem
(K. Shimizu and M. Nakamoto)
Nonlinear Predictive Control Using Local Models - Applied to a Batch Fermentation Process
(B.A. Foss, T.A. Johansen and A.V. Sørensen)
Application of Geometric Nonlinear Control in the Process Industries - A Case Study
(S.D. Dore, J.D. Perkins and L.S. Kershenbaum)
Statistical Process Control of Multivariate Processes
(J.F. MacGregor and T. Kourti)
Predictive Maintenance Using PCA
(D.R. Lewin)
Knowledge Based Control Structuring of a Distillation Plant Start-Up
(H. Yazdi, M. Bahar, A. Koggersbol and S.B. Jørgensen)

IFAC Meeting Papers - Keyword Listing
Real Time Programming, June 1994, Isle of Reichenau, Lake Constance, Germany
Integration of Process Design and Control, June 1994, Baltimore, Maryland, USA

Index of IFAC Meeting Papers
Book Reviews
Conference Calendar

**Control Engineering
Practice**
Volume 3, Number 4
April 1995

Preview:

Keynote Paper: A Performance Analysis of a Hard Real-Time System
(C.M. Bailey, A. Burns, A.J. Wellings and C.H. Forsyth)
Multivariable Control for a Combined Cycle Power Plant
(M. Nakamoto, K. Shimizu and H. Fukuda)
Autonomous Neural Control in Flexible Space Structures
(G.G. Yen)
A Study on Real-Time Optimization of a Fedbatch Recombinant *Escherichia Coli* Fermentation
(A.K. Hilaly, M.N. Karim and J.C. Linden)
Multivariable Control Using the Singular Value Decomposition in Steel Rolling with Quantitative Robustness Assessment
(J. Ringwood)
Optimal Control of Physiological Processes of Plants in a Green Plant Factory
(T. Morimoto, T. Torii and Y. Hashimoto)
Horizontal Communication of the PSW-8 Multifunction Controller
(L. Trybus, M. Sniezek and Z. Swider)
Dynamic Route Guidance, Congestion and Disobedience to Route Advice
(J. Weymann, J.-L. Farges and J.-J. Henry)

Papers from the ISPE/IFAC Conference of CAD/CAM, Robotics and Factories of the Future
(Guest Editor: M.B. Zaremba)

Preface to the Papers from the ISPE/IFAC Conference of CAD/CAM, Robotics and Factories of the Future
(M.B. Zaremba)
Process Management in Manufacturing
(V. Thomson)
Towards a Truly Flexible Manufacturing System
(A. Adlemo, S.-A. Andreasson, M. Fabian, P. Gullander and B. Lennartsson)
Graphics-Oriented Expert Shell for the Design and Configuration of Distributed Control Systems
(W. Langley, M.B. Zaremba and I. Popescu)
Flow-Shop Scheduling Design in an FMS Matrix Framework
(H.-H. Huang, F.L. Lewis, O.C. Pastravanu and A. Gürel)
Optimizing Automotive Manufacturing Sequences Using Simulated Annealing and Genetic Algorithms
(W. Mergenthaler, W. Stadler, H. Wilbertz and N. Zimmer)
Calibration Applied to Quality Control in Robot Production
(K. Schröder, R. Bernhardt, S. Albright, H. Wörn, S. Kyle, D. van Albada, J. Smyth and R. Meyer)

IFAC Meeting Papers - Keyword Listing
Intelligent Manufacturing Systems, June 1994, Vienna, Austria
Advances in Control Education, August 1994, Tokyo, Japan

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IMSE '94
**European Workshop on
Integrated Manufacturing
Systems Engineering**
12 - 14 December 1994
Grenoble, France

The European Workshop on Integrated Manufacturing Systems Engineering, was organized by INRIA in association with EC DG III ESPRIT CIME, IFIP WG 5.7 (Production Management) in conjunction with the IFAC TC on Manufacturing, Modelling, Management and Control.

The Workshop was attended by 115 persons both from academia and industry instead of the 80 originally expected. The main aim of the Workshop was to bring together European experts to address and discuss key issues of manufacturing systems modelling, specification, analysis and integration. The Workshop agenda covered a balanced spectrum of papers on enterprise architectures, modelling and infrastructures, the concept of the extended enterprise, concurrent engineering, Petri nets, manufacturing systems scheduling and standardization issues. The discussions centered around the direction of further work required, one being the issue of how to best integrate different methodologies with possibly one language into one enterprise framework enabling the enactment of enterprise models and covering the entire enterprise system life cycle. Another issue concerned the needs for integration, where process coordination is considered to be the key for intra-enterprise integration while internetworking is the key for inter-enterprise integration as needed by the extended enterprise.

50 technical papers from a total of 85 submitted ones were accepted for presentation and included into the proceedings in addition to 7 invited contributions.

The keynote papers included the following ones:

- Industry Requirements and Associated Research Issues in the Extended Enterprise (Prof. J. Browne, University College Galway, Ireland)
- Enterprise Engineering with CIMOSA - Application at FIAT (K. Kosanke, CIMOSA Association, Germany, C. Reyneri, FIAT, Italy)
- The AIT Initiative (B. Girard, PSA Peugeot Citroen, France)
- The Generalized Enterprise Reference Architecture and Methodology (GERAM) - A Proposal from the IFAC/IFIP Task Force for a Potential Universal Standard (Prof. T.J. Williams, Purdue University, USA)

The last of these keynote papers was complemented by a special session on standardization issues including reports by the European Standardization Committee (CEN) and the German QCIM project of DIN on enterprise modelling and integration. The Workshop was followed by a two-day meeting of CEN TC 310 WG 1 on these issues.

F. Vernadat
General Chairman

Papers

A Canonical Parametrization of the Kronecker Form of a Matrix Pencil
(J.M. Berg, H.G. Kwatny)
The Role of Signal Processing Methods in the Robust Design of Prediction Control
(P. Banerjee, S.L. Shah)
Output Feedback Variable Structure Control Design
(R.A. DeCarlo)
Nonlinear Model-Based Control Using Second Order Volterra Models
(F.J. Doyle III, B.A. Ogunnaike, R.K. Pearson)

Brief Papers

Frequency Domain Adaptive Control: Band-wise Compensation
(Yu Tang, E.F. Camacho, J.J. Flores)
Analysis and Design of Two Types of Digital Repetitive Control Systems
(Woo Sok Chang, Il Hong Suh, Tae Won Kim)
Fault Isolation in Industrial Processes by Dynamic Table of States Meth.
(J.M. Koscielny)
Fast Subspace-Based System Identification: An Instrumental Variable Approach
(Young Man Cho, T. Kailath)
Analysis of Linear Methods for Robust Identification in L₁
(J.P. Partington, P.M. Makila)
Worst-case Optimality of Smoothing Algorithms for Parametric System Identification
(R. Tempo)
On the Solution of Discrete-Time Markovian Jump Linear Quadratic Control Problems
(H. Abou-Kandil, G. Freiling, G. Jank)
Adaptive Sliding Mode Control in Discrete Time Systems
(G. Bartolini, V. Utkin, A. Ferrara)
The Realization Problem for Linear Periodic Systems
(P. Colnari, S. Longhi)
Multivariable Controller for Redundantly Actuated Systems - A Numerical Design Approach for Open-Loop Data
(Jeng-Tzang H. Chan)

Technical Communiques

Necessary and Sufficient Conditions for the Existence of a G-Type Lyapunov Function
(Kaiqi Xiong)

Book Reviews

Time Delay Systems: Stability and Performance Criteria with Application, by J.E. Marshall, H. Gorecki, K. Walton, A. Korytowski
(E.B. Lee)
Analysis and Design of Discrete Linear Control Systems, by N. Karcanias
(V. Kucera)

Safety, Reliability and Applications of Emerging Intelligent Control Technologies

(SRAEICT '94)

IFAC Workshop

Hong Kong, 12 - 14 December, 1994

This Workshop was the first in the series on safety and reliability of control systems using intelligent control technologies. The Workshop was sponsored by the IFAC Technical Committee on Safety of Computer Control Systems. Also supporting the Workshop were local chapter/section of IEEE and IEE.

The Workshop was attended by 73 participants from 10 countries. 37 papers were selected by the International Program Committee out of a totally submitted number of 65. The papers were arranged in 8 sessions, covering a range of topics such as fuzzy systems, neural networks, genetic algorithms, and applications in power systems, autonomous vehicles, real time control and fault detection. Highlights of the meeting were five keynote papers and two panel discussion sessions. There was a lively exchange between authors and participants.

The tune of the Workshop was set by Professor M.G. Rodd in the first keynote paper of the Workshop, on the question whether it was possible to have safe AI. The safety and reliability issues of software and control system specifications were further exemplified by the keynote speakers Prof.

L. Motus and G.L. Johnson on the second day of the Workshop. The keynote speakers on the third day, Profs. C.J. Harris and A.C. Tsoi, presented an overview of the latest development in neurofuzzy algorithms and neural networks. The first panel discussion, chaired by Prof. L. Motus, with G.L. Johnson and L. Beltracchi as members, was devoted to the discussion on how to improve the safety and reliability of control systems. The second one was chaired by Prof. M.G. Rodd, with Prof. C.J. Harris, Drs. S.S. Woo and R. Vingerhoeds as members. The discussion was on the current and future research problems in neurofuzzy algorithms in real time control. The presented papers were grouped into 8 sessions genetic algorithms, real-time control, neural networks, fuzzy systems, autonomous vehicle, fault detection, power systems and expert/intelligent systems. The best presented paper, recommended by the keynote speakers, was the paper entitled 'Enhancing Aircraft Engine Condition Monitoring', presented by P. Janssens and co-authored by M. Aznar Fernandez-Montesinos and R.A. Vingerhoeds.

C.W. Chan
NOC Chairman

Newly Approved Events

Title	Date	Place	Deadline	Further Information
IFIP/IFAC Working Conf Nov. Models & Methodologies f. Enterprise Integration 1995	8-11	Heron Islands QLD, Australia	1 May 1995	A. Laffey, Conference Secret. Australian Computer Society POB 135 Aspley (Brisbane) QLD 4034, Australia FAX +61/7/2637020 e-mail: ei95@cit.gu.edu.au
IFAC Workshop Control Applications of Optimization 1995	Dec. 19-21	Haifa Israel	15 May 1995	Prof. J. Shinar, Fac. of Aerosp. Engg., Technion, Technion City Haifa 32000, Israel FAX +972/4/231848 e-mail: aer4301@technion.tech
IMEKO/IFAC Congress New Measurements - Challenges and Visions 1997	June 2-6	Tampere Finland	*	Prof. O. Aumala, TTKK/MIT POB 692, SF 33101 Tampere Finland FAX +358/3131/3162171
IFAC Symposium (3rd) Intelligent Components & Instruments f. Control Applications - SICICA '97 1997	June 9-11	Ancey France	1 Sept. 1996	Prof. L. Foulloy, LAMII/ CESALP, BP 806 F-74016 Ancey, France FAX +33/50666020 e-mail: foulloy@univ-savoie.fr
IFAC Symposium Robust Control Design 1997	June 25-27	Budapest Hungary	30 Sept. 1996	Ms. Cs. Banyasz, Computer & Automation Res.Inst., POB 63 H-1518 Budapest, Hungary FAX +361/1667503 e-mail: h10kev@huella.bitnet
IFAC(CIGRE) Symp. Control of Power Plants and Power Systems 1997	August 18-21	Beijing China, P.R.	31 May 1996	Chinese Association of Autom. POB 2728, Beijing 100080 China, P.R. FAX +861/2545229
IFAC Symposium Fault Detection, Supervision & Safety for Technical Processes SAFEPROCESS '97 1997	August 25-28	Hull UK	30 Sept. 1996	Prof. R. Patton, Dept. of El.Eng Hull Univ., Hull HU6 7RX, UK FAX +44/482/466664 e-mail: r.j.patton@e-eng.hull.ac.uk