# International Federation of Automatic Control Secretariat: Schlossplatz 12, A-2361 Laxenburg, Austria Phone (+43 2236) 71 447, Fax (+43 2236) 72 8 59, E-mail: secr@ifac.co.at - URL: http://www.ifac-control.org 2004 No. 2 April International Federation of Automatic Control Secretariat: Schlossplatz 12, A-2361 Laxenburg, Austria Phone (+43 2236) 71 447, Fax (+43 2236) 72 8 59, E-mail: secr@ifac.co.at - URL: http://www.ifac-control.org

### Contents:

IFAC Journals *					
Modelling and Control in Biomedical Systems IFAC Symposium, Australia, August 2003					
*					
Papers from Control Engineering Practice, Nos 3, 4 & 5, 2004					
*					
Forthcoming Events 2004					
*					
Papers from Automatica, Nos 3, 4 & 5, 2004					

## **IFAC Journals**

The Tables of Contents of the IFAC Journals

Engineering Applications of Artificial Intelligence

of the

and of

Journal of Process Control

### **Annual Reviews in Control**

can be found respectively at

http://www.elsevier.com/wps/find/ journaldescription.librarians/975/description

http://www.elsevier.com/wps/find/ journaldescription.librarians/30445/description

http://www.elsevier.com/wps/find/journaldescription.librarians/429/description

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## Modelling and Control in Biomedical Systems (including Biological Systems) 5<sup>th</sup> IFAC Symposium Melbourne, Australia, 21 – 23 August, 2003

The 5th IFAC Symposium on Modelling and Control in Biomedical Systems (including Biological Systems) was held in Hilton on the Park, Melbourne, Australia, from 21–23 August 2003. The Symposium was sponsored by IFAC TC on Modelling and Control of Biomedical Systems (BIOMED) and co-sponsored by the International Union of Physical and Engineering Sciences in Medicine (IUPESM), the Institute of Electrical and Electronic Engineers, Engineering in Medicine and Biology Society (IEEE-EMBS), the International Measurement Confederation (IMEKO), Engineers Australia (IEAust), the University of Sydney, and the Hong Kong Polytechnic University.

Previous Symposia on this prominent theme took place in Venice, Italy in 1988, Galveston, USA in 1994, Warwick, UK in 1997 and Karlsburg/Greifswald, Germany in 2000. A precursor to this series of events was a Conference on "Regulation & Control in Physiological Systems" sponsored by IFAC (Systems Committee), American Physiological Society and the International Union of Physiological Sciences that was held at the University of Rochester, USA in 1973.

The aim of the 5<sup>th</sup> IFAC BIOMED Symposium was to act as an international forum for researchers and practitioners, both in academia and industry, to present their latest research and ideas in the field of biomedical system control and modelling, including but not limiting to:

- Biomedical Functional Imaging and Data Modelling
- Biomedical Kinetic Modelling and System Control
- Biomedical Systems and Signal Processing
- Cellular and Molecular Systems, and Bioinformatics
- Circulatory and Respiratory Systems
- Critical Care and Decision Support Systems
- Endocrine and Metabolic Systems
- Neurosystems and Musculoskeletal Systems

Being multi- and interdisciplinary in nature, 101 papers representing 24 countries (28 countries if co-authors' home countries are also included) were carefully reviewed and selected for presentation in the Symposium by the International Programme Committee consisting of 95 members, who are prominent researchers in various disciplines of biomedical system modelling and control. In order to accommodate the large number of high quality papers presented in the single-track sessions of the Symposium over the tight two day schedule, short oral presentations at the platform plus 1.5-hour poster presentation and discussion with the attendees before the posters were the main means used during this Symposium for attendees to exchange ideas. Such a combination of short oral presentations at the platform (in a single-track session) and discussions with attendees before the well displayed posters had proven to be the most effective way to exchange ideas in a number of the most prestigious conferences recently, including our own previous IFAC symposia. In addition, 25 papers, in most cases one paper per country, were selected for oral presentations. Both groups of papers possess the same high quality in spite of their difference in modes of presentation. In the light of a vote of the IPC members and session chairs at a meeting held right after the Symposium was closed, 13 application-oriented papers and 3 theoretical papers were selected and their extended versions will be recommended for possible inclusion in Control Engineering Practice and Automatica, respectively.

The programme of the Symposium included eight sessions, with four oral presentation sessions and three poster sessions, as well as a plenary session in which two invited keynote presentations were given by internationally prominent and wellrecognised research leaders. One is in the area of clinical research and was given by Dr. Geoffrey Parkin, Founding Director of the Intensive Care Unit at the Monash Medical Centre in Melbourne. The other was in the IT-related and high-tech research area given by Dr. Wesley W. Chu, Professor and Former Head, Department of Computer Science, University of California at Los Angeles.

The TC meeting was held on the first day of the event and a number of issues were discussed, including the scope of the TC, membership development and enhancement, summary report from the Chairman, plans for future activities, and possible research collaborations.

The Symposium attracted over 100 participants from 24/28 countries. It was the also the first IFAC event that a Proceedings volume instead of a Preprints volume was available to delegates at the Symposium. This kind of publication arrangement was discussed during the 15<sup>th</sup> Triennial World Congress in Barcelona with Elesevier. The Symposium was a success, and the TC on BIOMED decided that the 6<sup>th</sup> IFAC BIOMED Symposium will be held in Reims, France in September, 2006.

D. Feng, NOC Chair



A Journal of **IFAC** the International Federation of Automatic Control

### Papers from the March 2004 Issue

HDD Dual-stage Servo-controller Design Using a µ-analysis Tool

G. Herrmann, G. Guo

Economic Evaluation and Design of an Electric Arc Furnace Controller Based on Economic Objectives

D.J. Oosthuizen, I.K. Craig, P.C. Pistorius Regularised Kernel Density Estimation for Clustered Process Data

Q. Chen, U. Kruger, A.T.Y. Leung High Performance Hybrid Mold Level Controller for Thin Slab Caster

D. Lee, Y. Kueon, S. Lee

Synchronous Disturbance Attenuation in Magnetic Bearing Systems Using Adaptive

Compensating Signals

J. Shi, R. Zmood, L. Qin Design of Generalized Conceptual Guidance Law Using Aim Angle K.-S. Kim, Y. Kim

### Special Section on Benchmarking Modelling and Control in Wastewater Treatment

Preface

U. Jeppsson and M.-N. Pons

### Editorial

The COST Benchmark Simulation Modelcurrent State and Future Perspective

U. Jeppsson, M.-N. Pons Simulation of Respirometry-based Detection and Mitigation of Activated Sludge Toxicity

J.B. Copp, H. Spanjers

Benchmarking Procedure for Full-scale Activated Sludge Plants A. Abusam, K.J. Keesman, H. Spanjers, G. van

Straten Comparison of Advanced Control Strategies for

Improving the Monitoring of Activated Sludge Processes

W Zarrad J Harmand M Devisscher J P Stever Multicriteria Control Strategy for Cost/quality Compromise in Wastewater Treatment Plants C. Cadet, J.F. Beteau, S. Carlos Hernandez Control Strategy Robustness with Respect to Hydraulics M.-N. Pons, O. Potier

Benchmarking Combined Biological Phosphorus and Nitrogen Removal Wastewater Treatment Processes

K.V. Gernaey, S.B. Jorgensen

### Papers from the April 2004 Issue

Improvements to the Water Management of a Runof-river HPP Reservoir: Methodology and Case Study

D. Paravan, T. Stokelj, R. Golob

Block-oriented Block-oriented Approximate Feedback Linearization for Control of Pneumatic Actuator System

Xiang, J. Wikander

Regularisation Approach for Real-time Modelling of Aero Gas Turbines

T.V. Breikin, V.Y. Arkov, G.G. Kulikov Recursive Spline Interpolation Method for Realtime Engine Control Applications

A. Stotsky, A. Forgo

A Simple Method for Robust Control Design, Application on a Non-linear and Delayed System: Engine Torque Control

Y. Chamaillard, P. Higelin, A. Charlet

A Controlled Friction Damper for Vehicle Applications E. Guglielmin

E. Guglielmino, K.A. Edge The Implementation of a Dual-redundant Control System Y. Zhao, F. Liu

### Special Section on UKACC Conference Control 2002

### Preface S. Daley

Four-term Bilinear PID Controller Applied to Four-term Binnear ... an Industrial Furnace S. Martineau, K.J. Burnham, O.C.L. Haas, G. Andrews, A. Heeley Active Vibration Control for Marine

Applications

S. Daley, F.A. Johnson, J.B. Pearson, R. Dixon Global Optimisation-based Control Algorithms Applied to Boundary Layer Transition Problems G.V. Veres, O.R. Tutty, E. Rogers, P.A. Nelson Towards Fault-tolerant Active Control of Rotormagnetic Bearing Systems

M.O.T. Cole, P.S. Keogh, M.N. Sahinkaya, C.R. Burrows

From Research to Product Using a Common Development Platform

M. Tombs, M. Henry, C. Peter

### Papers from the May 2004 Issue

Model Based Diagnosis of the Air Path of an Automotive Diesel Engine

M. Nyberg, T. Stutte

Feedback Control for QoS of Mixed Traffic in Communication Networks

H.S. Kim, S.Y. Shin, W.H. Kwon

An Automated Performance Monitor for Process Controllers

Q. Li, J.R. Whiteley, R.R. Rhinehart

Neural-network-based Payload Determination of a Moving Loader

M. Savia, H.N. Koivo

Computational Simulation and Experimental Research on Speed Control of VVVF Hydraulic Elevator

Y. Huayong, Y. Jian, X. Bing

Field Performance Assessment of the ADVANCE-F Automatic Steering Control Vehicle

T.-H. Chang

Robust Disturbance Observer for the Trackfollowing Control System of an Optical Disk Drive J.R. Ryoo, T.-Y. Doh, M.J. Chung

Quality Prediction in Pulp Bleaching: Application of a Neuro-fuzzy System

R.P. Paiva, A. Dourado, B. Duarte

Control Approaches to Bio- and Ecological Systems

Y. Hashimoto, I. Farkas, H. Murase, E.R. Carson, A. Sano

### Special Section on Fuzzy System Applications in Control

### Preface

### P. Albertos and A. Sala

Fuzzy Modelling of Carbon Dioxide in a Burning Process

M. Ruusunen, K. Leiviska

Engine Load Prediction in Off-road Vehicles Using Multi-objective Nonlinear Identification

K. Maertens, T.A. Johansen, R. Babuska Fuzzy Control of Reactive Navigation with Stability Analysis Based on Conicity and Lyapunov Theory F. Cuesta, A. Ollero

Fuzzy State Feedback Gain Scheduling Control of Servo-pneumatic Actuators

H. Schulte, H. Hahn

# FORTHCOMING EVENTS

2004No. 2 April

Title	2004	Place	Further Information
IFAC Symposium Cost Oriented Automation – COA04	June 7 – 9	Gatineau Canada	http://www.uqo.ca/blum/ifac/ e-mail: heinz.erbe@tu-berlin.de
IFAC Symposium Automatic Control in Aerospace	June 14 – 18	St. Petersburg Russia	http://aca2004.aanet.ru e-mail: aca2004@aanet.ru
IFAC Symposium Telematics Applications in Automation and Robotics – TA 2004	June 21 – 23	Helsinki Finland	http://www.automaatioseura.fi/TA04 e-mail: office@atu.fi
American Control Conference – in co-operation with IFAC –	June 30 – July 2	Boston MA, USA	http://www.mie.uiuc.edu/acc2004/ e-mail: speyer@seas.ucla.edu
IFAC Symposium Intelligent Autonomous Vehicles – IAV 2004	July 5 – 7	Lisbon Portugal	http://iav04.isr.ist.utl.pt e-mail: iav04@isr.ist.utl.pt
IFAC Symposium Dynamics and Control of Process Systems – DYCOPS-7	July 5 – 7	Cambridge MA, USA	http://www.dycops.org/ e-mail: craven@dycops.org

# FORTHCOMING EVENTS (ctd.)

Cattor Lapplications in Marine Systems       7-9       Iuly       e-mail: carmol46/junian.it         FAC Workshop Fractional Differentiation and its Processing       19-20       Processing       http://www.hg.u.be/ordeaux.fr/fdb/thome.html         FAC Workshop Fractional Differentiation       20 - 23       Austatala       http://www.agcc2004.com/ e-tail.it.soki/giver.it.mc.e.au         TAC Sympositin Trace S	Title	2004	Place	Further Information
Fractional Differentiation and its         19 - 20         France         e-mail: Addr{201p.u-bordeau.ff           Asian Control Conference (5th)         July         Melbourne         http://www.ascc2004.com/           Asian Control Conference (5th)         July         Addresser         http://www.ascc2004.com/           TRAC Symposium         26 - 28         Japan         e-mail: State-Staty wast include and possible and possi	IFAC Conference Control Applications in Marine Systems – CAMS 2004			
- In co-operation with IFAC - 20 - 23 Australia c-final: secolice run as an exp [Pfs2004] I argo State Systems: Theory and Applications 20 Ocidas appendix the charal: Inter-Iso404(journal runch ong coskica u.a.c. [pf 152004] I argo State Systems: Theory and Applications 20 Ocidas appendix 28 - 31 CA, USA c-mail: Inter-Iso404(journal runch ong coskica u.a.c. [pf 152004] IFAC Symposium (Control of 28 - 31 CA, USA c-mail: Systems: Systems: Theory and Applications 28 - 31 CA, USA c-mail: SWF_2004(Journal cong coskica u.a.c. [pf 152004] INFTCC/IIAC Luit Conference Information 25 - 28 Portugal bitmp?/www.cicingo.org IFAC Symposium (Control, August 20 - Yokohama 25 - 28 Portugal c-mail: secretariat@icinco.org IFAC Symposium 6 <sup>th</sup> Norther, August 20 - Yokohama 25 - 28 Portugal c-mail: katayama@iamp i.kyoto-u.a.c. [p IFAC Symposium 6 <sup>th</sup> Norther, August 20 - Yokohama 25 - 28 Northgart bitmp?/www.cicingo.org IFAC Symposium 6 <sup>th</sup> Norther, August 20 - Yokohama 20 - Yokohama 20 - mail: katayama@iamp i.kyoto-u.a.c. [p IFAC Symposium 6 <sup>th</sup> Norther 2 - 4 Northar bitmp?/www.cicingo.org IFAC Symposium 6 <sup>th</sup> Norther 2 - 4 Northar bitmp?/www.cicingo.org IFAC Symposium 6 <sup>th</sup> Norther 2 - 4 Northar bitmp?/www.cicingo.org IFAC Symposium 6 <sup>th</sup> Norther 2 - 4 Northar bitmp?/www.cicingo.org IFAC Symposium 6 <sup>th</sup> Norther 2 - 4 Northar bitmp?/www.cicingo.org IFAC Symposium 6 <sup>th</sup> Norther 2 - 4 Northar bitmp?/www.cicingo.org IFAC Symposium 6 <sup>th</sup> Norther 2 - 4 Northar bitmp?/www.cicingo.org IFAC Symposium 6 <sup>th</sup> Norther 2 - 4 Northar bitmp?/www.cicingo.org IFAC Symposium 6 <sup>th</sup> Norther 2 - 4 Northar bitmp?/www.cicingo.org IFAC Symposium 6 <sup>th</sup> Norther 2 - 4 Northar bitmp?/www.cicingo.org IFAC Symposium 6 <sup>th</sup> Norther 2 - 4 Northar bitmp?/www.cicingo.org IFAC Symposium 1 <sup>th</sup> Reserve 1 - 4 Northar bitmp?//www.cicingo.org IFAC Symposium 1 <sup>th</sup> Reserve 1 - 5 - 8 Northar 1 - 5 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	IFAC Workshop Fractional Differentiation and its Applications – FDA '04	July 19 – 20		http://www.lap.u-bordeaux.fr/fda04/home.html e-mail: fda04@lap.u-bordeaux.fr
Large Seale Systems: Theory and Applications         26 - 28         Japan         e-mail: the-lss04@watt.thech.org.osska-u.ac.jp           IFAC Symposium Modeling and Control of Ecotomic Systems         July 28 - 31         Redlands         http://newton.uoredu/fines.sme.2004/ e-mail: Sknet.thech.org.scska-u.ac.jp           INSTECTIFAC INTO Control of Acoustics in Control, Automation and Robotics - ICINCO 2004         August 25 - 28         Setubal         http://www.icinco.org           IFAC Workshops on - Adaptation and Learning in Control and Systems - NOLCOS '04         August 30 - September 1         Yokohama Japan         http://www.icinco.org           IFAC Workshops on - Adaptation and Systems - NOLCOS '04         September 1         Statiggart Japan         http://www.contra.dkcio.ac.jp           IFAC Systems - NOLCOS '04         September 1         Statiggart Japan         http://www.icinco.org           IFAC Symposium 6 <sup>th</sup> Avacaced Control Systems - NOLCOS '04         September         Statiggart July         http://www.icinco.org           IFAC Symposium 6 <sup>th</sup> Avacaced Control Fducation - Breace Japan         September         Vienna Australia         http://www.icinco.ac.ip/ifacws04/main.htm           IFAC Workshop Real Time Programming         September 6 - 7         Greenoble France         htm://www.icinco.ac.ip/ifacws04/main.htm           IFAC Workshop Real Time Programming         September 6 - 8         Greenoble France         htm://www.icinco.ac.ip/ifacws04/main.htm	Asian Control Conference (5th) – in co-operation with IFAC –	July 20 – 23		
Modeling ind Control of     28 – 31     CA, USA     e-mail: SME_2004/6[Redfinds 3cdu       Economic Systems     August     Setubal     http://www.icinco.org       Informatics in Control, Automation     25 – 28     Portugal     http://www.icinco.org       Informatics in Control, Automation     25 – 28     Portugal     http://www.icinco.org       Informatics in Control, Automation     25 – 28     Portugal     http://www.cenutrsd.keio.ac.jp/facws04/main.htm       - Adaptation and Learning in Control	IFAC Symposium Large Scale Systems: Theory and Applications	July 26 – 28		
Informatics in Control, Automation     25 - 28     Portugal     e-mail: scerctariat(@fcinco.org       IFAC Workshops on     - Adaptation and Learning in Control and Signal Processing - ALCOSP     - September 1     Japan       Periodic Control Systems - PNOLCOS*04     September 1     Japan     e-mail: katayama@amp.ikyoto-u.ac.jp       IFAC Symposium 6 <sup>th</sup> Nonlinear Control Systems - NOLCOS*04     September 1     Stuttgart     http://www.intrutwicin.ac.at/asco94/ e-mail: katayama@amp.ikyoto-u.ac.jp       IFAC Multitack Conference Advanced Control Education -     September 2 - 4     Vienna Austria     http://www.intrutwicin.ac.at/asco94/ e-mail: katayama@amp.ikyoto-u.ac.jp       IFAC Workshop Internet Based Control Education -     September 6 - 7     Grenoble France     http://www.intrutwicin.ac.at/asco94/ e-mail: kdisney@mail.newcastle.edu.au       IFAC Workshop Real Time Programming IFAC Workshop 6 - 8     September 6 - 7     Grenoble France     http://www.intrutwicin.ac.at/seco94/ e-mail: kdisney@mail.newcastle.edu.au       IFAC Workshop 8     September 6 - 8     System     http://www.intrutwicin.ac.at/seco94/ e-mail: kdisney@mail.newcastle.edu.au       IFAC Workshop 8     September 7 - 9     Atlanta GA (USA     http://www.intrutwicin.ac.at/seco94/ e-mail: kdisd@cs.kuleuven.ac.bd       IFAC Workshop 8     September 7 - 9     Atlanta GA (USA     http://www.intrutwicin.ac.at/seco94/ e-mail: kdisd@cs.kuleuven.ac.bd       IFAC Workshop 116     September 8     Lucven     http://www.intrutwici	IFAC Symposium Modeling and Control of Economic Systems			
<ul> <li>- Adaptation and Learning in Control and Signal Processing -ALCOSPS - Periodic Control Systems - PSYCO</li> <li>- August 30 - Japan</li> <li>- Adaptation and Learning in Control September 1</li> <li>- Japan</li> <li>- Control Systems - PSYCO</li> <li>- September 1</li> <li>- Strutgart - Germany</li> <li>- trail: katayama@amp.ikyoto-u.ac.jp</li> <li>- trail: how-incomposition 6<sup>th</sup> - Moninear Control Systems - NOLCOS'04</li> <li>- September 2</li> <li>- 2 - 4</li> <li>- 7</li> <li>- 8</li> <li>- 10</li> <li>- 8</li> <li>- 8</li> <li>- 10</li> <li>- 10</li></ul>	INSTICC/IFAC Intl. Conference Informatics in Control, Automation and Robotics – ICINCO 2004			
TFAC Symposium 6 <sup>th</sup> Nonlinear Control Systems – NOLCOS'04       September 1 - 3       Stuttgart Germany       http://www.nolcos2004_gist.uni-stuttgart.de e-mail: http://www.inft.twiena.ca.t/acs04/ e-mail: http://www.inft.twiena.ca.t/ September         IFAC Workshop IrAC Workshop CHIP/IFORS/IEA) Symposium 9 <sup>e</sup> - WRIP 2004       September 6 - 8       Istanbul Turkey       http://www.enc.umd.edu/iwss2004/ e-mail: hose.Huttabe/Giume.cdu.au         IFAC Workshop IrAC Workshop Sth Time Delay Systems       September 6 - 8       Istanbul Turkey       http://www.enc.umd.edu/iwss2004/ e-mail: hose.Huttabe/ GA, USA         IFAC Workshop Sth Time Delay Systems       September 8 - 10       Leuven GA, USA       http://www.cs.kuleuven.ac.be/ e-mail: http://	IFAC Workshops on – Adaptation and Learning in Control and Signal Processing – ALCOSP Particula Sustama, PSVCO			e-mail: sano@sd.keio.ac.jp
FAC Multitrack Conference Advanced Control Strategies for Social and Economic Systems     September 2 - 4     Vienna Austria     http://www.ihrt.tuwien.ac.at/acs04/ e-mail: kopacek@ihrt.tuwien.ac.at/acs04/ e-mail: kopacek@ihrt.tuwien.ac.at	IFAC Symposium 6 <sup>th</sup>	September	Stuttgart	http://www.nolcos2004.uni-stuttgart.de
FAC Workshop Internet Based Control Education –       September 6 - 7       Grenoble France       http://ibce.lag.ensieg.inpg.fr         IFAC Symposium Mechatronic Systems       September 6 - 8       Sydney Australia       http://rumi.newcastle.edu.au/mech2004/ e-mail: kdinsey@mail.newcastle.edu.au         IFAC Workshop Real Time Programming - WRTP 2004       September 6 - 8       Istanbul Turkey       http://www.ence.um.deu/uss2004/ e-mail: Jose.Hurtado@umd.edu         IFAC/URFIP/FORS/IEA) Symposium 9 <sup>th</sup> Analysis, Design, and Evaluation of Analysis, Design, and Evaluation of Prof. Systems       September 8 - 10       Atlanta GA, USA       http://www.isve.gatech.edu/IFAC-HMS2004 e-mail: sheila.devezin@isve.gatech.edu         IFAC Symposium 11 <sup>th</sup> Actomation Systems       September 8 - 10       Leuven Belgium       http://www.era.uubp-naey.fr/ifac-mmm2004/ e-mail: db4@cs.kuleuven.ac.be/conference/tds04/ e-mail: db4@cs.kuleuven.ac.be/conference/tds04@cs04/ e-mail: db4@cs.kuleuven.ac.be/conferen	IFAC Multitrack Conference Advanced Control Strategies for	September	Vienna	http://www.ihrt.tuwien.ac.at/acs04/
Mechatronic Systems $6-8$ Australiae-mail: kdisney@mail.newcastle.edu.auIFAC Workshop Real Time Programming $5-8$ Istanbul Turkeyhttp://http://www.ene.umd.edu/iwss2004/ e-mail: Jose.Hurtado@umd.eduIFAC/(IFIP/IFORS/IEA) Symposium 9th Analysis, Design, and Evaluation of T=9September GA, USAhttp://www.isye.gatech.edu/IFAC-IMS2004 e-mail: sheila.devezin@isye.gatech.eduIFAC/(IFIP/IFORS/IEA) Symposium 9th Manalysis, Design, and Evaluation of T=9September BelgiumAtlanta e-mail: ds04@es.kuleuven.ac.be/conference/ds04/ e-mail: ds04@es.kuleuven.ac.be/IFAC Symposium 11th Maconton in Mining Mineral and Advanced Fuzzy/Neural ControlSeptember $8-10$ Nancy FranceIFAC Workshop 2 <sup>nd</sup> Advanced Fuzzy/Neural ControlSeptember $16-17$ Nancy FranceIFAC Workshop Discrete Event SystemsSeptember 22-24Reims PranceIFAC Workshop reneal: Usods04/@univ-reims.fr/wodes04 e-mail: wodes04@univ-reims.fr/IFAC Workshop reneals GSCP-2004September $24-26$ PereslavI-Zalessky RussiaIFAC Workshop reneals GSCP-2004September $24-26$ PereslavI-Zalessky RussiaIFAC Workshop reneals GSCP-2004October $3-5$ Bansko BulgariaIFAC Workshop regional and Global Aspects (DECOM - TT)October $24-35$ Bansko BulgariaIFAC Workshop regional and Global Aspects (DECOM - TT)October $2-5$ Bansko BulgariaIFAC Workshop regional and Global Aspects (DECOM - TT)October $28-31$ Bansko BulgariaIFAC Conference Adv	IFAC Workshop Internet Based Control Education – IBCE'04			http://ibce.lag.ensieg.inpg.fr e-mail: ibce@inpg.fr
Real Time Programming - WRTP 2004       6 - 8       Turkey       e-mail: Jose.Hurtado@umd.edu         WRTP 2004       FAC/(FIP/IFORS/IEA) Symposium 9 <sup>th</sup> Analysis, Design, and Evaluation of T - 9       Atlanta GA, USA       http://www.isye.gatech.edu/IFAC-HMS2004         Human-Machine Systems - HMS 04       September       Leuven Belgium       http://www.cs.kuleuven.ac.be/conference//ds04/         IFAC Workshop 5th Time Delay Systems       September 8 - 10       Belgium       http://www.cran.uhp-nancy.ft/fac-mmm2004/         Automation in Mining, Mineral and Metal Processing - MMM 2004       September 8 - 10       Nancy France       http://www.eran.uhp-nancy.ft/fac-mmm2004/         IFAC Workshop 2 <sup>nd</sup> September 16 - 17       Oulu http://www.eran.uhp-nancy.ft/fac-mmm2004/       e-mail: mmm2004@cran.uhp-nancy.ft/fac-mmm2004/         IFAC Workshop 2 <sup>nd</sup> September 22 - 24       Reims 16 - 17       France e-mail: mom2004@cran.uhp-nancy.ft         IFAC Workshop 5(ht) 16 - 17       September 22 - 24       Reims e-mail: mom2004@cran.uhp-nancy.ft       e-mail: mom2004@cran.uhp-nancy.ft         IFAC Workshop 2 <sup>sel</sup> September 22 - 24       Reims e-mail: mom2004@cran.uhp-nancy.ft       e-mail: mom2004@cran.uhp-nancy.ft         IFAC Workshop 3Chronol       September 22 - 24       PereslavI-Zalessky kuu.if       http://www.uhiv-reims.ft       e-mail: wodes04@cniv-reims.ft         IFAC Workshop 40       September 3 - 5       Desida	IFAC Symposium Mechatronic Systems			http://rumi.newcastle.edu.au/mech2004/ e-mail: kdisney@mail.newcastle.edu.au
Analysis, Design, and Evaluation of Human-Machine Systems – HMS 04       7 - 9       GA, USA       e-mail: shella.devezin@isye.gatech.edu         Human-Machine Systems       8 - 10       Belgium       http://www.esk.uleuven.ac.be/conference/tds04/ e-mail: tds04@cs.kuleuven.ac.be         IFAC Workshop 5th Metal Processing – MMN 2004       September 8 - 10       Nancy France       http://www.eran.uhp-nancy.fr/ifac-mmm2004/ e-mail: mmm2004@cran.uhp-nancy.fr         IFAC Workshop 2 <sup>nd</sup> Advanced Fuzzy/Neural Control       September 16 - 17       Oulu Finland       http://www.istat.oulu.fi/ e-mail: office@atu.fi         IFAC Workshop Discrete Event Systems       September 22 - 24       Reims France       http://www.univ-reims.fr/wodes04         IFAC Workshop Discrete Event Systems       September 22 - 24       Pereslavl-Zalessky Russia       http://www.boik.ru/PSI/CPRC/GSCP2004         IFAC Workshop Discrete Event Systems       September 22 - 24       Pereslavl-Zalessky Russia       http://www.boik.ru/PSI/CPRC/GSCP2004         IFAC Workshop Automatic Systems for Building the Insfrastructure in Developing Countries: Regional and Global Aspects (DECOM – TT)       October 3 - 5       Bansko Bulgaria       http://www.liophant.org/i_m_scs/i3m2004/avcs/ e-mail: rachid@u-picardie.fr         SCS/IFAC Conference Advances in Vehicle Control and Safety – 2CS/IFAC Conference Management and Control of Production and Logistics – MCPL-2004       November 2 - 5       Santiago Chile       http://www.uamericas.et/MCPL2004 e-mail: mcpl@uamericas.cl	IFAC Workshop Real Time Programming – WRTP 2004			http:// http://www.enre.umd.edu/iwss2004/
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### Papers from the March 2004 Issue

### Papers

Robust Stability and Controllability of Stochastic Differential Delay Equations with Markovian switching

C. Yuan, X. Mao Implicit Fault-tolerant Control: Application to Induction Motors

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R. Skjetne, T.I. Fossen, P.V. Kokotovic

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Large-scale Convex Optimization Methods for Air Quality Policy Assessment D.A. Carlson, A. Haurie, J.-P. Vial, D.S. Zachary Linear time-derivative trackers S. Ibrir Robust Adaptive Control of a Class of Nonlinear Systems with Unknown Dead-zone X.-S. Wang, C.-Y. Su, H. Hong A New Actuator Activation Policy for Performance Enhancement of Controlled Diffusion Processes M.A. Demetriou, N. Kazantzis Auto-tuning of Phase Lead/lag Compensators A.P. Loh, X. Cai, W.W. Tan Processing Data from Scanning Gauges on Industrial Web Processes S. Duncan, P. Wellstead Non-regular Feedback Linearization of Nonlinear Systems via a Normal Form Algorithm D. Cheng, X. Hu, Y. Wang Adaptive Switching Supervisory Control of Nonlinear Systems with No Prior Knowledge of Noise Bounds D. Angeli, E. Mosca Computation of State and Input Trajectories for Flat Systems Using Automatic Differentiation K. Robenack, O. Vogel Almost Disturbance Decoupling of MIMO Nonlinear Systems and Application to Chemical Processes X. Liu, A. Jutan, S. Rohani Attractors and Partial Stability of Nonlinear Dynamical Systems LV. Miroshnik Nonlinear Observers for Perspective Time-invariant Linear Systems R. Abdursul, H. Inaba, B.K. Ghosh Scheduling of a Limited Communication Channel for Optimal Control H. Rehbinder, M. Sanfridson Uncertain Jumping Systems with Strong and Weak Functional Delays M.S. Mahmoud Detection Filter Design for LPV Systems a Geometric Approach J. Bokor, G. Balas **Technical Communiques** 

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- X. Yang Maximizing Robustness of Supervisors for Partially Observed Discrete Event
- S. Takai

### Papers from the April 2004 Issue

### Papers

Coverage in Fault-tolerant Control

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- Anti-windup Synthesis via Sampled-data Piecewise Affine Optimal Control

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A Continuation/GMRES Method for Fast Computation of Nonlinear Receding Corizon Control

T. Ohtsuka

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A. Chiuso, G. Picci

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P. Grieder, F. Borrelli, F. Torrisi, M. Morari

### **Book Reviews**

Nonlinear and Adaptive Control of Complex Systems, by Alexander L. Fradkov, Iliya V. Miroshnik and Vladimir O. Nikiforov A. Serrani

Optimal Control, an Introduction, by Arturo Locatelli

F. Dabbene

### Papers from the May 2004 Issue

### Papers

Computionally Efficient Estimation of Wave Propagation Functions from 1-D Wave Experiments on Viscoelastic Materials

K. Mahata, T. Söderström, L. Hillström

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G. Calafiore, L. El Ghaoul

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H. Ishii, T. Basar, R. Tempo

A Practical Method for Analyzing the Stability of Neutral Type LTI-time Delayed Systems N. Olgac, R. Sipahi

Iterative Learning of Model Reference Adaptive Controller for Uncertain Nonlinear Systems with Only Output Measurement

C.J. Chien, C.Y. Yao

Constrained RHC for LPV Systems with Bounded Rates of Parameter Variations

P.G. Park, S.C. Jeong

Improved Robust H<sub>2</sub> and H-inifinite Filtering for Uncertain Discrete-time Systems

L. Xie, L. Lu, D. Zhang, H. Zhang

Adaptive Extremum Seeking Control of Continuous Stirred Tank Bioreactors with Unknown Growth Kinetics

M. Guay, D. Dochain, M. Perrier

### **Technical Communique**

A Convex Optimization Approach to the Mode Acceleration Problem D.H. Owns, E. Rogers

### Correspondence

Comments on "On the Equivalence of Causal LTI Iterative Learning Control and Feedback Control' D.H. Owens, E. Rogers

Author's Reply to Comments on "On the Equivalence of Causal LTI Iterative Learning Control and Feedback Control"

### **Book Review**

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