17th IFAC World Congress
Pre-Congress Tutorials and Workshops
5 – 6 July, 2008
IFAC Council- and Related Meetings,
IFAC General Assembly, 7 July 2008

Contents:

As the date of the 17th IFAC World Congress is approaching, it is time to get ready for registration and preparation of traveling. Flights must be booked, hotel rooms reserved. All the relevant information in this respect can be found on the Congress website at http://www.ifac2008.org/

Registration deadlines are
Advance (before April 10, 2008)
Full Registration   USD 550
Retiree Registration   USD 250
Student Registration   USD 250

On-site (after April 10, 2008)
Full Registration   USD 650
Retiree Registration   USD 300
Student Registration   USD 300

Hotel registration through the online hotel registration form on the Congress website is possible as of February 1, 2008. The Congress organizers have made block reservations at the hotels indicated.

All of the information relevant for the Congress can be obtained from the IFAC webiste at http://www.ifac2008.org/ but here, in the IFAC Newsletter, we would like to draw your attention to some specific aspects of the Congress and of the IFAC administrative meetings which take place at the time of the Congress.

Altogether, almost 4000 papers have been submitted to the International Program Committee of the World Congress – a record high of submissions. We can therefore expect an excellent Congress in all respects. The preliminary program can already be downloaded from the Congress website. In addition to the plenaries, the standard lectures and poster presentations, the Congress will host various highlight programs on ubiquitous robotic companions: life-care intelligent robots; automation in the steel industry; automation in the semiconductor, display, and electronics industry; control technology in the automotive industry; automation in shipbuilding; and control education.

The Saturday and Sunday preceding the Congress, will be dedicated to Pre-Congress Tutorials and Workshops. Details on the contents of these can be found on the Congress website.

Pre-Congress Tutorials and Workshops

Saturday, July 5

Code	Title	Proposers	Time
WS1	Complex Embedded and Networked Control Systems	Alexander L. Fradkov, Francoise Lamnabhi-Lagarrigue	9:00 – 17:30
TT1	Advances in Three Term Control	Lee H. Keel, Youngchol Kim, Shankar P. Bhattacharyya	9:00 – 17:30
TT2	Convex Optimization	Stephen P. Boyd, Lieven Vandenberghe, Michael Grant	14:00 – 17:30
TT3	Identifier Based Adaptive Control: A Unified Tutorial and MATLAB/Simulink Toolbox	Baris Fidan, Petros A. Ioannou	14:00 – 17:30
WS2	Identification & Control of Unstable Systems	M. Chidambaram, Seshagiri Rao Ambati, Padma Sree Ravi	9:00 – 17:30
TT4	Modeling and Control of Roll-to-Roll Material Processing Systems	Prabhakar R. Pagilla, Dominique Knittel, KeeHyun Shin	9:00 – 17:30
TT5	Observers for systems with unknown inputs: A practical guide to design and applications	Stanislaw H. Zak	9:00 – 17:30
TT6	Chance Constrained Process Optimization and Control under Uncertainty	Pu Li	9:00 – 17:30

Pre-Congress Tutorials and Workshops

Sunday, July 6

Code	Title	Proposers	Time
WS1	Complex Embedded and Networked Control Systems	Alexander L. Fradkov, Francoise Lamnabhi-Lagarrigue	9:00 –17:30
TT1	Advances in Three Term Control	Lee H. Keel, Youngchol Kim, Shankar P. Bhattacharyya	9:00 – 17:30
TT2	Convex Optimization	Stephen P. Boyd, Lieven Vandenberghe, Michael Grant	9:00 – 17:30
TT3	Identifier Based Adaptive Control: A Unified Tutorial and MATLAB/Simulink Toolbox	Baris Fidan, Petros A. Ioannou	9:00 – 17:30
TT7	Robustness in Systems Biology: Methods and Applications	Eric Bullinger, Hong Yue, Frank Allgower	9:00 – 17:30
TT8	Biological Control Systems	Babatunde A. Ogunnaike	9:00 – 17:30
TT9	Emerging networked sensing and actuation technologies: state of the art, system design and applications	Elena Gaura	9:00 - 17:30
TT10	Mechatronics - Modeling, Component Interconnection, Sensors, Actuators, Control, and Integrated Design	Clarence W. de Silva	9:00 – 17:30
TT11	Ordinal Optimization: Soft Optimization for Hard Problems	Yu-Chi Ho, Leyuan Shi, Chun-Hung Chen, Qianchuan Zhao, Qing-Shan Jia	9:00 – 17:30
TT12	Variable Structure Systems with Sliding Modes and their Applications	Xinghuo Yu, Jian-Xin Xu	9:00 – 17:30
WS3	Analysis and Design of Distributed Adaptive Networks	Ali H. Sayed	9:00 – 17:30
WS4	Embedded Control Systems: from design to implementation	Pedro Albertos	9:00 – 17:30
WS5	Cooperative Control of Multiple Autonomous Vehicles	Pedro Aguiar, Antonio M. Pascoal, Joao Hespanha, Isaac Kaminer, Wei Ren	9:00 – 17:30
WS6	Continuous-time Model Identification from Sampled Data	Liuping Wang, Hugues Garnier, Graham C. Goodwin, Torsten Soderstrom, Rik Pintelon	9:00 – 17:30
WS7	Delays, Feedbacks and Interconnections: From Simple structures to Complex Networks	Silviu-Iulian Niculescu, Joono Cheong	9:00 – 17:30
WS8	Stochastic Model Predictive Control	Mark Cannon, Basil Kouvaritakis	9:00 – 17:30
WS9	Self-optimizing control: Theory and Applications	Vinay Kariwala, Sigurd Skogestad	9:00 – 17:30

In addition to the World Congress and the exciting technical program, the technical tours offered and the social program provided, the Triennial IFAC World Congress is also the time when the IFAC National Member Organizations convene to hold the General Assembly meeting. At that meeting, the new leadership for the 2008-2011 triennium will be elected, headed by the new IFAC President, Professor Alberto Isidori from Italy. Around this very important meeting, the various Boards and Committees of the IFAC Administration will get together to set the course for the future of the Federation. As already described in previous issues of the Newsletter, IFAC has gone fully electronic in its meeting publications. The Prague Congress Proceedings of 2005 and even the ones of the World Congress in Barcelona in 2002 are already published electronically and availabe at http://www.ifac-papersonline.net/ This is a daring, and at the same time future-oriented venture. But it will allow all interested persons to have even better access to the results of control engineers worldwide, and yet encourage control engineers to come to IFAC meetings, to present their papers and have them published on the worldwide web, accessible to everyone, yet citable and thus also providing international scientific acceptance. The IFAC administrative meetings will start already on July 4, 2008. The General Assembly is scheduled for July 7, 2008, following the Opening of the World Congress.

The Tables of Contents of the IFAC Journals can be found respectively at

Automatica
http://www.elsevier.com/locate/automatica

Control Engineering Practice
http://www.elsevier.com/locate/conengprac

Engineering Applications of Artificial Intelligence
http://www.elsevier.com/locate/engappai

Journal of Process Control
http://www.elsevier.com/locate/jprocont

Annual Reviews in Control
http://www.elsevier.com/locate/arcontrol

Journal on Mechatronics
http://www.elsevier.com/locate/mechatronics

Adaptation and Learning in Control and Signal Processing
ALCOSP 2007
IFAC Workshop (9th)

Periodic Control Systems
PSYCO 2007
IFAC Workshop (3rd)

St. Petersburg, Russia, 29 – 31 August, 2007

Two IFAC events were organized in Saint Petersburg in the Anichkov Palace on August 29-31, 2007: the 9th Workshop on "Adaptation and Learning in Control and Signal Processing (ALCOSP 2007)" and the 3rd Workshop on „Periodic Control Systems (PSYCO 2007)". Both events were a success with 125 registered participants from 22 countries, including 40 from Russia, 22 from Japan, 12 from France, 9 from the Czech Republic, 8 from the USA. The technical program included 136 regular talks (90 in ALCOSP'07 and 46 in PSYCO'07), 10 plenary talks and 22 posters. Details, including the technical program can be seen on the websites of ALCOSP'07 http://conf.physcon.ru/alcosp07/ and PSYCO 2007: http://conf.physcon.ru/psyco07/.

Among highlights of the technical program there were plenary talks of top experts in the area of systems and control: B.D.O. Anderson (Australia), F.L.Chernousko (Russia), M.Krstic (USA), A.Shiriaev (Sweden, Norway), V.A.Bondarko and V.A.Yakubovich (Russia), M.Tomizuka (USA), A.Astolfi (UK), I.I.Blekhman (Russia), A.B.Kurzhanski (Russia), P.R.Kumar (USA).

B.D.O. Anderson (AU) in his plenary talk "Historical, Generic and Current Challenges of Adaptive Control" reviewed three different types of challenges to adaptive control. The first group comprises challenges that are concerned with methodological development. They include difficulties associated with the MIT rule, bursting, the Rohr's counterexample and unplanned instability in iterative identification and control. An understanding of these phenomena and mitigating strategies are now available. The second group comprises difficulties that are intrinsic to virtually any adaptive control algorithm, and that have frequently been overlooked. For example, if a plant is unknown, and a control objective is set, the objective may in practical terms be unachievable, and any adaptive control algorithm needs to deal with that possibility. The third group of problems comprises some issues to which researchers are currently devoting significant attention, including multiple model adaptive control and model free design.

M. Krstic (US) presented several recently developed techniques for adaptive control of PDE systems based on three different design methods – Lyapunov design, passivity-based design and swapping design. The basic ideas for each design are introduced through benchmark plants with constant unknown coefficients. It is then shown how to extend the designs to reaction-advection-diffusion PDEs in 2D.

A survey of the method of finitely-convergent algorithms in the theory of adaptive systems was presented in his talk by **V.A. Bondarko** based on work by **V.A. Yakubovich**. The method consists of reduction of an adaptive control problem to a countable system of inequalities. The method often allows to obtain suboptimal (in the minimax sense) adaptive control systems. Basic ideas and achievements as well as some recent results were considered, particularly adaptive control of sampled systems with time delay which is not a multiple of the sampling period. In this relation a problem of limiting zeros of sampled systems with delay arise. It is shown that limiting values of the sampling zeros have the same properties as zeros of Euler polynomials.

A novel approach for the solution of nonlinear adaptive control problems was proposed in his talk by **A. Astolfi (UK)**. This approach does not rely on structural assumptions on the system to be controlled nor on linear parameterization. The approach is illustrated by means of several applications, including wing rock elimination, an adaptive visual servoing problem, control of a power converter, and a flight control problem.

P. Kumar (US) discussed organizing principles for three different types of emerging systems: wireless networks, sensor networks, and networked control. The question of what should be the architecture of wireless networks, as well as determining fundamental limits on their information carrying capacity was addressed. Finally, the problem of networked control, where nodes can act on their environment was considered and an abstraction of virtual collocation for enabling the proliferation of such systems was proposed.

The talk of **A.S. Shiriaev (Sweden, Norway)** was devoted to orbital stabilization of periodic motions of underactuated mechanical systems by means of feedback control design based on construction of a transverse linearization. Roughly speaking, the transverse linearization is a periodic linear system of dimension one less than the nonlinear system such that stabilization of this system is in a certain sense equivalent to exponential orbital stabilization of a desired periodic motion of the original nonlinear system. For a large class of nonlinear mechanical systems including many popular research benchmark set-ups (the Furuta pendulum, the Acrobot, a pendulum on a cart, a spherical pendulum) and applications (bipeds, ocean-going vessels) transverse linearization of any feasible orbit, which in general is related to defining moving Poincaré sections, can be introduced analytically.

There were four invited sessions at ALCOSP'07: Modelling technique for adaptive control design (Organizer S. Masuda, Japan); Passification-based Adaptive and Robust Control (Organizers D. Peaucelle (France), A. L. Fradkov (Russia); Simple Adaptive Control (Organizers I. Barkana (USA), A. L. Fradkov (Russia); Neural Networks (Organizer O. A. Stepanov, Russia) and two invited sessions at PSYCO'07: Discrete and Hybrid Control systems (Organizers G. Leonov (Russia), H. Nijmeijer (The Netherlands); Computational methods and Software Tools for periodic systems (Organizer A. Varga, Germany) An interesting panel discussion devoted to strengthening links with industry was organized before the closing ceremony. Invited panelists were chosen among participants of the Workshops affiliated with industrial companies:
Dr. Itzhak Barkana (Kulicke & Soffa Industries, Inc., USA), Dr.Yevgeny Somov (State Research & Production Rocket-Space Center TsSKB-Progress, FKA, Russia), Dr. Oleg Stepanov (CS&RI Elektropribor, Russia). The discussion was moderated by Dr. Martin Gitsels, the Head of „Corporate Technologies" Department at Siemens, Russia. Opening the discussion, Dr. Gitsels said that in order to gain interaction of theorists and industry people it is important to bear in mind that industry is interested in solutions to concrete practical problems rather than in general theory. Success of cooperation depends essentially on mutual understanding of partners. Panelists agreed that further development of general theoretical approaches is not of interest to industry. They also pointed out that there is strong demand for good textbooks for

engineers, written in simple and clear language; and that the universities should produce specialists with a broad view and unprejudiced attitude to practical problems. Participants commented on the importance of contributions made by industry to the universities to meet their needs. An interesting comment was made by Prof. K. Furuta (Japan) who said that young people get interested in practical problems when they can see some challenge or even crisis coming from industry – when some problems cannot be solved by existing approaches. If no such challenges are observed, we need to create them in order to maintain mutual interest of industry and universities.

Alexander Fradkov,
Sandor Veres

Fieldbuses and Networks in Industrial and Embedded Systems
FeT 07
IFAC Conference
Toulouse, France
November 7 – 9, 2007

The 2007 FeT – Fieldbuses and Networks in Industrial and Embedded Systems was held in Toulouse, France. FeT'2007 was supported by a large International Program Committee with about 50 members from 17 countries, 9 of them from Europe. 96 papers from 16 different countries were submitted. Overall 50 high quality papers were selected for presentation at the conference: 37 as regular papers and 13 as work in progress papers.

The conference was organized in 11 sessions with the following topics: wireless systems, networked control systems, real-time communications, analysis I and II, applications I and II, wireless personal area networks, work in progress I and II, and sensor networks.

The serial and parallel sessions permitted comprehensive discussion of the papers.

A keynote speech from the Technical University of Berlin was organized. It was entitled "How to exploit spatial diversity in wireless industrial networks", it was presented by Dr. Andreas Willing, and reflected the current interest of wireless communications for industrial and embedded applications.

An outstanding industrial session on the subject "Applications of Embedded Systems" was also organised by AIRBUS. It allowed to discuss avionics, space and transportation applications

Besides the challenging technical program, the conference included a nice social program with a high quality welcome reception at the Toulouse City Hall, and a conference dinner at the Hôtel d'Assézat. Toulouse is the center of the aerospace valley and participants could enjoy a visit to Airbus while profiting to reinforce the work and friendship ties already existing among this research community.

Miguel León Chávez

Charles Stark Draper Prize
awarded to Rudolf Kalman

The 2008 Charles Stark Draper Prize will be awarded to Rudolf Kalman for

the devlopment and dissemination of the optimal digital technique (known as the Kalman Filter) that is pervasively used to control a vast array of consumer, health, commercial and defense products.

The Kalman Filter uses a mathematical technique that removes „noise" from series of data. From incomplete information, it can optimally estimate and control the state of a changing, complex system over time. The Kalman filter revolutionized the field of control theory and has become pervasive in engineering systems. It has been applied to systems and devices in nearly all engineering fields and continues to find new uses today. Applications include target tracking by radar, global positioning systems, hydrological modeling, atmospheric observations, time-series analyses in econometrics, and automated drug delivery.

Rudolf Kalman is Professor Emeritus of the Swiss Federal Institute of Technology in Zurich. He invented the Kalman filter, a mathematical technique that removes „noise" from series of data. From incomplete information, it can optimally estimate and control the state of a changing, complex system over time. The Kalman filter revolutionized the field of control theory and has become pervasive in engineering systems. Kalman conceptualized his theory in the late 1950s while at the Research Institute for Advanced Studies in Baltimore (then part of the Glenn L. Martin Co., which became Lockheed-Martin Corp.). It was published in the breakthrough paper „A new approach to linear filtering and prediction problems" (Transactions of the ASME-Journal of Basic Engineering, 82D:35–45, 1960). Kalman soon published two other influential papers, one on the state space theory of linear systems, and another on concepts of controllability and observability. When Kalman presented these new approaches in seminars, audience members were thrilled by his elegant solution to their stubborn obstacles. Kalman's ideas enabled a broad range of technologies to achieve unprecedented accuracy and to be used in previously unimagined ways. Recognition of the Kalman filter's utility began in the early 1960s with aerospace and military applications such as guidance, navigation, and control systems. It was quickly applied to systems and devices in nearly all engineering fields and continues to find new uses today. Applications include target tracking by radar, global positioning systems, hydrological modeling, atmospheric observations, time-series analyses in econometrics, and automated drug delivery. Kalman continued studying many fundamental ideas in control and systems theories throughout his career, and he has received many awards and honors for a lifetime of achievements, including the first Kyoto Prize in Advanced Technology (1985) from the Inamori Foundation, the IEEE Medal of Honor (1974), and the American Mathematical Society's Steele Prize (1987). He is a member of the American National Academy of Engineering, the American National Academy of Sciences, and the American Academy of Arts and Sciences.

IFAC
FORTHCOMING EVENTS
2008 No. 1 Feb.

Title	2008	Place	Further Information
IFAC Workshop Navigation, Guidance & Control of Underwater Vehicles (NGCUV2008)	April 08 – 10	Killaloe, Co Lare Ireland	http://www.ngcuv08.com/ e-mail: ngcuv08@ul.ie
INSTICC/IFAC Conference Informatics in Control, Automation and Robotics – ICINCO 2008	May 11 – 15	Funchal Madeira Portugal	http://www.icinco.org e-mail: secretariat@icinco.org
10th IEEE/IFAC Workshop Variable Structure Systems – VSS'08	June 08 – 10	Antalya Turkey	http://www.mecha.ee.boun.edu.tr/VSS2008/ e-mail: okyay.kaynak@boun.edu.tr
American Control Conference – in cooperation with IFAC	June 12 – 14	Seattle, WA USA	http://www.a2c2.org/conferences/acc2008/ e-mail: aanna@mit.edu
17th IFAC WORLD CONGRESS	**July 06 – 11**	**Seoul Korea**	**http://www.ifac2008.org e-mail: Secretariat@ifac2008.org**
4th IPME/IFAC Conference Structural Control – 4ECSC	September 08 – 12	St. Petersburg Russia	http://www.ipme.ru/ipme/conf/4ecsc e-mail: 4ecsc@director.ipme.ru
Ewics/IFAC Conference Computer Safety, Reliability and Security – SAFECOMP 2008	September 22 – 25	Newcastle upon Tyne UK	http://safecomp2008.org/ e-mail: M-A.Sujan@warwick.ac.uk
IFAC Workshop 9th Intelligent Manufacturing Systems – IMS 2008	October 09 – 10	Szczecin Poland	http://ims08.ps.pl e-mail: ims08@ps.pl
IFAC Workshop 3rd Fractional Differentiation and its Applications – FDA'08	November 05 – 07	Ankara Turkey	http://www.cankaya.edu.tr/fda08 e-mail: fda08@cankaya.edu.tr
Title	2009	Place	Further Information
IFAC Symposium Fault Detection, Supervision and Safety for Technical Processes – SAFEPROCESS	June 30 – July 3	Barcelona Spain	http://safeprocess09.upc.es/ e-mail: joseba.quevedo@upc.edu
IFAC Symposium Identification and System Parameter Estimation- SYSID'09	July 06 – 08	St. Malo France	http://www.sysid2009.org/ e-mail: secretariat@sysid2009.org
IFAC Symposium Advanced Control of Chemical Processes – ADCHEM 2009	July 12 – 15	Istanbul Turkey	http://www.adchem09.ku.edu.tr/ e-mail: dburak@ku.edu.tr
IFAC Symposium Robot Control. – SYROCO 2009	September 10 – 12	Gifu Japan	http://www.syroco2009.org/ e-mail: syroco2009_office@syroco2009.org