INTERNATIONAL WORKSHOP ON HYBRID AND PREDICTIVE CONTROL FOR NONLINEAR INDUSTRIAL APPLICATIONS

Royal College Building

Tuesday 28th, Wednesday 29th and Thursday 30th April 2009

The workshop will be hosted by the University of Strathclyde in co-operation with the University of Glasgow. Workshop venue: *The University of Strathclyde, Court Senate/Suite, Collins Building, 22 Richmond Street, Glasgow G1 1XQ.*

Aims: This is the fourth workshop on the subject of Nonlinear Control and Applications. The Industrial Control Centre, co-sponsored by EPSRC, ACTC, IET, InstMC, IEEE, IEEE-UKRI, AFRL and National Instruments, aims to pull together scientists, academics, industrialists and practitioners giving emphasis to applications and new results in nonlinear and predictive control.

The workshop is carefully structured to be of interest to both engineers in industry and to students and academics. The first day of the 3-day event workshop will be concerned with an overview of new technology with contributions from National Instruments and Quanser who will introduce the latest design and simulation tools, and equipment. The aim is to demonstrate the new software and hardware tools available that will improve the design and implementation of control systems for nonlinear applications, and particularly for predictive control systems.

The second day of the workshop will be aimed at participants from industry to introduce the subjects of nonlinear control predictive control and hybrid systems and to also describe applications with possible advantages and problems. Problems in the implementation of advanced control and signal processing methods will be considered and their use in embedded systems for applications such as wind turbine control and for networked systems control will be discussed.

The final day of the 3-day workshop is to look to future developments in both theory and applications. The advances in nonlinear control and the importance of hybrid systems research will be considered and new developments in predictive control which offer solutions at both supervisory and regulatory level. Members of the European Union HYCON network have been invited to present talks on the application of hybrid systems.

The workshop provides an exciting opportunity for all attendees to be up-dated with the state-of-the-art of nonlinear control. This event will be a good opportunity to establish good relationships with partners responsible for developments on nonlinear control. The level of the presentations will be suitable for research students and there will be demonstrations of hardware and software tools in the *hand-on session*. The new software and hardware tools are suitable for both real time control and for control systems design.

Registration, Payments, please go to the following web page:
http://www.actc-control.com/events/meetings/meet090428.asp

All administration enquiries to: *Sheila Campbell* email: s.campbell@eee.strath.ac.uk at the:
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Website: **http://www.icc.strath.ac.uk/**

Venue maps and information on Getting to Strathclyde:
John Anderson Campus: http://www.strath.ac.uk/maps/johnandersoncampus/
Collins Building: http://www.strath.ac.uk/maps/collinsbuilding/
Graham Hills Building: http://www.strath.ac.uk/maps/grahamhillsbuilding/
Royal College Building: http://www.strath.ac.uk/maps/royalcollegebuilding/

Organised by: University of Strathclyde and University of Glasgow

Co-sponsored by:
Applied Control Technology Consortium
Engineering and Physical Sciences Research Council
Institute of Electrical and Electronics Engineers
IEEE UKRI Industry Applications Society
Institution of Engineering and Technology
Institute of Measurement and Control, Engineering
National Instruments in Newbury and Austin, Texas
The Air Force Research Laboratory
University of Stirling

DAY 1: TUESDAY, 28th APRIL 2009

Developments in Graphical System Design for Real-Time Control Applications

VENUE: The University of Strathclyde, Court Senate/Suite, Collins Building, 22 Richmond Street, Glasgow, G1 1XQ

09:00–09:25	REGISTRATION	Committee Room 1
	Session 1: Real-time control using LabVIEW	**Chair: Hong Yue, University of Strathclyde**
09:25–09:30	*Welcome and introduction*	Hong Yue
09:30–10:10	*Reduce hardware development time – prototype and deploy control systems faster*	Robert Morton, National Instruments, Newbury, UK
10:10–10:50	*Real-time implementation of controller and observer design using LabVIEW*	Pawel Majecki and Shamsher Ali Naz, University of Strathclyde
10:50–11:10	*Tea/Coffee*	*Committee Room 1*
	Session 2: Application oriented modelling and control I	**Chair : Robert Morton, National Instruments**
11:10–11:50	*Develop effective engineers - teach the practice of control with LabVIEW and the full range of Quanser control challenges*	Paul Karam**,** Quanser, Canada
11:50–12:30	*Nonlinear modelling and control of heavy marine handling equipment*	Paul McKenna, Glasgow Caledonian University
12:30–13:30	*Lunch*	*RCB 2.13 Killearn Room*
	Session 3: Hands-on Session	**Chair: National Instruments**
13:30–15:00	*Hands-on 'Rapid Control Prototyping with NI CompactRIO'*	National Instruments
15:00–15:20	*Tea/Coffee*	*Committee Room 1*
15:20–16:50	*Session 3: Hands-on Session (continued)*	National Instruments
16:50–17:15	*Wrap up & discussions*	National Instruments
17:15	**Close**	

DAY 2: WEDNESDAY, 29th APRIL 2009

Predictive Control and Applications

VENUE: The University of Strathclyde, Court Senate/Suite, Collins Building, 22 Richmond Street, Glasgow, G1 1XQ

09:00–09:30	**REGISTRATION**	**Committee Room 1**
	Session 4: Nonlinear predictive control I	**Chair: W.E. Leithead, University of Strathclyde**
09:30–10:10	*Predictive Functional Control (PFC) : principles and industrial applications*	Jacques Richalet, Consultant, France
10:10–10:50	*Model predictive control for nonlinear systems*	Mike Grimble, University of Strathclyde
10:50 –11:10	*Tea/Coffee*	*Committee Room 1*
	Session 5: Application oriented modelling and control II	**Chair: Mike Grimble, University of Strathclyde**
11:10–11:50	*The control of high-speed bursting in racing motorcycles*	David Limebeer, Imperial College London
11:50–12:30	*Emulation modelling and control of a multivariable power boiler system*	Peter Young, University of Lancaster
12:30–13:30	*Lunch*	*RCB 2.13 Killearn Room*
	Session 6: Nonlinear control applications I	**Chair: Amir Hussain, University of Stirling**
13:30–14:10	*Turbocharged diesel engine modelling for nonlinear engine control*	Silvio Simani, University of Ferrara
14:10–14:50	*Develop robust real-time controllers quickly and efficiently using rapid control prototyping*	Paul Karam, Quanser, Canada
14:50–15:30	*Multifidelity simulation for aerospace systems*	David Anderson, University of Glasgow
15:30–15:50	*Tea/Coffee*	Committee Room 1
	Session 7: Nonlinear control applications II	**Chair: Jiqiang Wang, University of Strathclyde**
15:50–16:30	*Nonlinear control of climate in greenhouses with stability guarantees*	Fernando Tadeo, Universidad de Valladolid
16:30–17:10	*Neurobiologically inspired intelligent control for autonomous vehicle control*	Amir Hussain, University Stirling
	Break	
19:00–21:00	**BANQUET**	The Italian Kitchen, G1 1EX

DAY 3: THURSDAY, 30th APRIL 2009

New Developments in Predictive and Nonlinear Control

VENUE: The University of Strathclyde, Court Senate/Suite, Collins Building,
22 Richmond Street, Glasgow, G1 1XQ

09:00–09:30	REGISTRATION	Committee Room 1
	Session 8: Nonlinear predictive control II	**Chair: Reza Katebi University of Strathclyde**
09:30–10:10	*Modern look at steady state bumpless transfer for hybrid applications: robust, optimal, instantaneous*	Joseph Bentsman, University of Illinois, Urbana-Champaign
10:10–10:50	*Predictive Functional control (PFC): implementation and teaching*	Jacques Richalet, Consultant, France
10:50 –11:10	*Tea/Coffee*	*Committee Room 1*
	Session 9: HYCON new technology	**Chair: Paul McKenna, Glasgow Caledonian University**
11:10–11:50	*Achievements and perspectives of hybrid control in process plants*	Daniel Sarabia, University of Valladolid
11:50–12:30	*Wireless mining ventilation control: a HYCON test case for networked control*	Alessandro D'Innocenzo, University of L'Aquila
12:30–14:00	*Lunch*	*GHB room 7.38*
	Session 10: New development in nonlinear control systems	**Chair: Hong Yue University of Strathclyde**
14:00–14:40	*UDE-based robust control of uncertain nonlinear systems with state delays*	Qingchang Zhong, University of Liverpool
14:40–15:20	*Towards bipedal running using hybrid control design*	Martin Brown, University of Manchester
15:20–16:00	*Nonlinear lossless equivalent systems by stabilised identification*	Tom Shenton, University of Liverpool
16:00	**Close**	

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