ADVANCES in REAL-TIME CONTROL of NONLINEAR SYSTEMS

Wednesday 5th, Thursday, 6th and Friday, 7th September 2007

Day One: Graphical System Design for Control using LabVIEW
Day Two: Real-time Nonlinear Control and Industrial Applications
Day Three: Advances in Nonlinear Real Time Control

Venue: The workshop will be hosted by the University of Strathclyde in co-operation with the University of Glasgow.

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

This workshop follows in a tradition of two previous meetings both concerned with nonlinear control systems, design and applications. However, this workshop will have the special theme associated with the ***real-time control*** of ***nonlinear*** dynamical systems. A real-time control system normally involves a computer system of limited resources that introduces a range of additional implementation problems. The problems of nonlinearities often limit the performance of real systems or in extreme cases can cause instabilities leading to major shut downs and loss of production or even dangerous failures.

This is an important area with a wide variety of applications in automotive and machinery controls and for applications in the process industries, including the design of supervisory control and data acquisition systems. It is relevant to the control of robots and servo systems and for the embedded systems in machine tools or domestic devices.

The first day of the 3-day event will be organised jointly with National Instruments and will dwell upon technology for real-time control.

The second day of the 3-day event will be aimed at engineers in industry and the speakers will provide tutorial introductions to the different real-time nonlinear algorithms and techniques, stressing the industrial applications advantages and benefits.

The third day of the 3-day meeting will focus on scientific advances in the subject and on recent theoretical developments. It is envisaged that developments in nonlinear predictive control, control of hybrid systems and distributed control systems will be covered. Problems in the implementation of advanced control and signal processing methods will be considered and their use in embedded systems for applications such as gas turbine controls and for networked systems control. In addition, the third day will be particularly appropriate for development engineers and for researchers in academia. The level of the presentations will be suitable for research students and there will be demonstrations of hardware and software tools in the coffee breaks and the lunch periods. The new software and hardware tools are suitable for both real time control and for control systems design.

The workshop represents an exciting opportunity for all attendees to be up-dated with non-linear control state-of-the-art. This event will be a good opportunity to establish good relationships with partners responsible for developments on nonlinear control.

Registration, Payments, please go to the following web page:
http://www.actc-control.com/meetings/meet070905.html

***Contact Details*: Industrial Control Centre, University of Strathclyde,**
Graham Hills Building, 50 George Street, Glasgow G1 1QE

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, USA

Wednesday, 5th September 2007

Day One: Graphical System Design for Control using LabVIEW

Summary: The aim of this day is to introduce the technology for real-time implementation of nonlinear control techniques and to discuss the problems of real-time control and the new developments which simplify the process.

VENUE: Registration: Killearn Room 2.13, Royal College Building, 204 George Street, Glasgow G1 1XW
VENUE: Workshop: Montrose Room 2.15, Royal College Building, 204 George Street, Glasgow G1 1XW

0900 – 0920	**REGISTRATION**	*2.13 Royal College Building: Killearn Room*
0920 – 0930	Welcome and introduction	Professor Mike Grimble and Dr Andrew Clegg
0930 – 1030	An overview of the new technology for real-time control	Dr. Subramanian (Ram) Ramamoorthy University of Edinburgh
1030 – 1045	*Tea/Coffee*	*2.13 Royal College Building: Killearn Room*
1045 – 1130	Introduction to NI Predictive Control toolbox Development and Applications Studies	Miss Luisella Balbis, University of Strathclyde
1130 – 1215	Using Commercial-Off-The-Shelf Tools for Rapid Control Prototyping	Mr Robert Morton, National Instruments
1230– 1330	*Lunch*	*2.13 Royal College Building: Killearn Room*
1340 – 1440	Control Design Hands-On	Mr Mike Bailey, National Instruments/Dr Subramanian (Ram) Ramamoorthy University of Edinburgh
1440 – 1510	*Break*	*2.13 Royal College Building: Killearn Room*
1510 – 1600	Control Design Hands-On (continued)	Mr Robert Morton, National Instruments/Dr Subramanian (Ram) Ramamoorthy University of Edinburgh
1600 – 1615	*Tea/Coffee*	*2.13 Royal College Building: Killearn Room*
1615 – 1700	Introduction to a design package for nonlinear control algorithms	Dr Pawel Majecki, University of Strathclyde
1700	**Close**	

Thursday, 6th September 2007

Day Two: Real-time Nonlinear Control Day for Industry

Summary: The aim of this day is to introduce nonlinear control techniques that are particularly relevant to real-time implementation and to discuss the problems of real-time control and the new developments which simplify the process.

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

VENUE: 1315-1400 hrs Laboratory, Graham Hills Building, Level 7, 50 George Street

0900 – 0930	**REGISTRATION**	**Committee Room 1**
0930 – 0940	Welcome and introduction	Professor Mike Grimble and Dr Andrew Clegg
0940 – 1010	Developments in real-time control software and hardware systems	Andrew Watchorn, National Instruments
1010 – 1040	Industrial importance of real-time control and a design example	Dr Nick Brignall, SELEX
1040 – 1150	*Tea/Coffee*	*Committee Room 1*
1050 – 1120	The design of nonlinear predictive controllers for real-time implementation: a graphical user interface	Dr Reza Katebi and Miss Luisella Balbis
1120 – 1210	Problems of real-time control in the process Industries	Dr Travis Hesketh, Emerson Process Control
1210 – 1315	*Lunch*	*ICC, Graham Hills Building, Level 7*
1315 – 1400	Real-time control software and hardware demonstrations	*Laboratory, Graham Hills Building, Level 7*
1415– 1445	Problems of real-time control in the automotive industry	Dr Jon Caine, Ford Motor Company
1445– 1500	*Tea/Coffee*	*Committee Room 1*
1500– 1530	Impact of nonlinearities and problems in real-time control for the petrochemical industry	Dr Paul Oram, BP Exploration Operating Co. Ltd
1530– 1600	Intelligent and non-linear control design for autonomous vehicle systems	Dr Amir Hussain and Dr R Abdullah, University of Stirling
1600	**Close**	

Friday, 7th September 2007

Day Three: Advances in Real Time Control

Summary: The aim of day two is to provide a more detailed introduction to new developments and design techniques and to encourage links between academia and industry. The focus will be on demonstrating the properties and advantages of these new solutions, with a number of industrial application examples to illustrate their benefits.

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

0900 – 0930	**REGISTRATION**	**Committee Room 1**
0930 – 0940	Welcome and introduction	Professor Bill Leithead and Dr Reza Katebi
0940 – 1020	Stochastic MPC with additive and multiplicative uncertainty and its application	Professor Basil Kouvaritakis, University of Oxford
1020 – 1030	*Tea/Coffee*	*Committee Room 1*
1030 – 1110	The design of simple nonlinear predictive controllers and real time implementation	Professor Mike Grimble, University of Strathclyde
1110 – 1150	The design of predictive controllers for nonlinear applications	Dr Eric Kerrigan, Imperial College London
1150 – 1300	*Lunch*	*ICC, Graham Hills Building, Level 7*
1300 – 1340	Application of nonlinear predictive control and inverse simulation methods to helicopter controls	Dr Marat Bagiev, University of Glasgow
1340 – 1420	Nonlinear Control Applications of State Dependent Parameter models	Dr James Taylor, Lancaster University
1420 – 1430	*Break*	
1430 – 1510	The design of nonlinear controllers for the process industries	Professor Hong Wang, University of Manchester
1510 – 1550	Development and application of design techniques for Industrial Application	Dr Silvio Simani, University of Ferrara
1550 – 1600	*Tea/Coffee*	*Committee Room 1*
1600 – 1640	Kernel-based reinforcement learning control for uncertain nonlinear system	Dr Xin Xu, National University of Defense Technology, China
1640 – 1730	Round Table	
1730	**Close**	