



The
University
Of
Sheffield.

Automatic
Control &
Systems
Engineering.

The Department of Automatic Control & Systems Engineering
is pleased to announce the following seminar:

A Distributed Networked Approach to Fault Diagnosis of Large-Scale Systems

Professor Thomas Parisini

*Department of Electrical and Electronic Engineering
Imperial College*

Wednesday, 9th October 2013 at 16:00

LT01, Sir Henry Stephenson Building

Abstract

This lecture deals with a class of systems that are becoming ubiquitous in the current and future “distributed world” made by countless “nodes”, which can be cities, computers, people, etc., and interconnected by a dense web of transportation, communication, or social ties. The term “network”, describing such a collection of nodes and links, nowadays has become commonplace thanks to our extensive reliance on “connections of interdependent systems” in our everyday life, for building complex technical systems, infrastructures and so on. In an increasingly “smarter” planet, it is expected that such interconnected systems will be safe, reliable, available 24/7, and of low-cost maintenance. Therefore, health monitoring and fault diagnosis are of customary importance to ensure high levels of safety, performance, reliability, dependability, and availability. For example, in the case of industrial plants, faults and malfunctions can result in off-specification production, increased operating costs, production line shutdown, danger conditions for humans, detrimental environmental impact, and so on. Faults and malfunctions need to be detected promptly and their source and severity should be diagnosed so that corrective actions can be taken as soon as possible.

In the talk, an adaptive approximation-based distributed and networked fault diagnosis approach for large-scale nonlinear systems will be dealt with, by exploiting a “divide et impera” approach in which the overall diagnosis problem is decomposed into smaller sub-problems, which can be solved within “local” computation and communication architectures. The distributed detection, isolation and identification task is broken down and assigned to a network of “Local Diagnostic Units”, each having a “local view” of the system. These local diagnostic units are allowed to communicate with each other through an information network to cooperate on the diagnosis of system components that may be shared or interconnected.

Biography

Thomas Parisini received the Ph.D. degree in Electronic Engineering and Computer Science in 1993 from the University of Genoa. He was with Politecnico di Milano and since 2010 he holds the Chair of Industrial Control at Imperial College London. Since 2001 he is also Danieli Endowed Chair of Automation Engineering with University of Trieste and in 2009-2012 he was Deputy Rector of University of Trieste. He authored or co-authored more than 250 research papers in archival journals, book chapters, and international conference proceedings. His research interests include neural-network approximations for optimal control problems, fault diagnosis for nonlinear and distributed systems and nonlinear model predictive control systems. He is a co-recipient of the 2004 Outstanding Paper Award of the IEEE Trans. on Neural Networks and a recipient of the 2007 IEEE Distinguished Member Award. He is involved as Project Leader in several projects funded by the European Union, by the Italian Ministry for Research, and he is currently leading consultancy projects with some major process control companies (ABB, Danieli, Duferco, Electrolux, among others). Thomas Parisini is the Editor-in-Chief of the IEEE Trans. on Control Systems Technology. He was the Chair of the IEEE Control Systems Society Conference Editorial Board and a Distinguished Lecturer of the IEEE Control Systems Society. He was an elected member of the Board of Governors of the IEEE Control Systems Society and of the European Control Association (EUCA) and a member of the board of evaluators of the 7th Framework ICT Research Program of the European Union. Prof. Parisini is currently serving also as an Associate Editor of the Int. J. of Control and served as Associate Editor of the IEEE Trans. on Automatic Control, of the IEEE Trans. on Neural Networks, of Automatica, and of the Int. J. of Robust and Nonlinear Control. Among other activities, he was the Program Chair of the 2008 IEEE Conference on Decision and Control and he is General Co-Chair of the 2013 IEEE Conference on Decision and Control. Thomas Parisini is a Fellow of the IEEE.