Center of Excellence in Intelligent Engineering Systems

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SEMINAR

Speaker: Prof. Sheng Chen

Southampton Wireless Group, Electronics and Computer Science, University of Southampton, UK

Distinguished HiCi Adjunct Professor
Department of Electrical and Computer Engineering,
King Abdulaziz University

Sheng Chen received his B.Eng. degree from the East China Petroleum Institute, Dongying, China, in 1982, and his Ph.D. degree from the City University, London, in 1986, both in control engineering. In 2005, he was awarded the higher doctoral degree, Doctor of Sciences (D.Sc.), from the University of Southampton, Southampton, U.K. From 1986 to 1999, He held research and academic appointments at the Universities of Sheffield, Edinburgh, and Portsmouth, all in the U.K. Since 1999, he has been with Electronics and Computer Science, the University of Southampton, U.K., where he currently holds the post of Professor in Intelligent Systems and Signal Processing. Prof. Chen's research interests include adaptive signal processing, wireless communications, modelling and identification of nonlinear systems, neural network and machine learning, intelligent control system design, evolutionary computation methods and optimization. He has published over 500 research papers. Prof. Chen is a Fellow of IET, a Distinguished Adjunct Professor at King Abdulaziz University, Jeddah, Saudi Arabia, and an ISI highly cited researcher in engineering (March 2004).

Date: **Monday, April 20, 2015**

Time: **1:00PM**

Venue: **Engineering Building, Second floor, Room 24C28 (ECE Seminar Room)**

Title

B-Spline Neural Network Approach for Modelling and Inverting Hammerstein Systems

Abstract

The Hammerstein system, which consists of a static nonlinearity followed by a linear dynamic subsystem, is widely found in nonlinear system modelling, process control and wireless communication applications. This talk presents an efficient B-spline neural network approach for modelling and inverting Hammerstein systems, including B-spline neural network architecture, optimality of B-spline modelling, efficient identification algorithm and inverting nonlinearity of the Hammerstein system. The talk is structured into two parts. The first part deals with the real-valued B-spline neural network approach for modelling and inverting RV Hammerstein systems with two process control application examples. The second part covers the complex-valued B-spline neural network approach for wireless communication systems which employ high-order quadrature amplitude modulation signaling with transmitter high power amplifier exhibiting nonlinear distortions. Three applications of the CV B-spline neural network approach for high-order QAM Hammerstein channels are included, which are adaptive channel equalization, single-carrier frequency-domain equalization, and single-carrier frequency-domain equalization and hybrid decision feedback equalization.

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