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SEMINAR SERIES ON COMPLEX SYSTEMS, NETWORKS, CONTROL AND CHAOS

Multi-user MIMO

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Date and Time: Friday, 31 October 2008, 4:30pm – 5:30pm

Venue: Room **CD634**, Hong Kong Polytechnic University

Reception starts at 4:15pm

(Language: **English**)

Abstract

Multi-user MIMO presents a new area of MIMO communications, and is being considered in the 3Gpp LTE and 802.16m standards. In this seminar, we will first analyze the sensitivity of the channel capacity versus the number of users for a multi-user MIMO communications system. Since, precoding and perturbation are two promising techniques to achieve near-capacity of multi-user MIMO channel, in this seminar, we will present the analysis of the statistical properties of the vector-perturbation scheme and propose a receiver that incorporates the statistical properties of the perturbation, thereby improving receiver performance. Next, we will also present a decomposition method called Generalized Multi-Unitary Decomposition (GMUD). GMUD can provide multiple solutions of beamforming matrices, and such property is particularly beneficial to a multi-user MIMO precoding system because the precoder will then be able to steer the transmission beams of individual users such that inter-user interference is minimized. In a limited feedback system, the proposed precoder is found to be robust to CSI quantization.

About the Speaker

Dr Chau Yuen received the B. Eng, M. Phil and PhD degree from Nanyang Technological University, Singapore in 2000, 2001 and 2004 respectively. He was the recipient of Lee Kuan Yew Gold Medal, IEE Book Prize, Institute of Engineering of Singapore Gold Medal, Merck Sharp & Dohme Gold Medal and twice the recipient of HP Prize. His Ph.D. thesis is focused on the design, analysis and optimization of space-time block code. He was a Post Doc Fellow in Lucent Technologies Bell Labs, Murray Hill during 2005. Currently, he works as a Senior Research Engineer in Institute for Infocomm Research (I2R, Singapore), where he involves in 802.11n Wireless LAN system, and participates actively in 3Gpp Long Term Evolution (LTE) standardization. His present research interests include multi-user MIMO, cooperative / relay communications, and game theory. He also serves as an Assoc. Editor for IEEE Trans. of Vehicular Technology.