学 术 报 告

ACADEMIC LECTURE

Topic： Communication and Control in wireless systems

Time： 2012年9月12日（周三）下午14:00-15:00

Venue： 信电大楼215学术厅

Speaker：Research Associate，Ying Cui, National Department of ECE at Northeastern University, US

Biography

Dr. Cui received her B.Eng degree (first class honor) in Electronic and Information Engineering from Xi’an Jiaotong University, Xi’an, China, in 2007. She received her Ph.D. in the Electronic and Computer Engineering (ECE) from the Hong Kong University of Science and Technology (HKUST), Hong Kong, in 2011, under the supervision of Prof. Vincent K. N. LAU. As a doctoral student, she was awarded Overseas Research Award and visited Yale University, US, as a Visiting Student under the supervision of Prof. Edmund M. Yeh from Jan. 2011 to Jul. 2011. From Jan. 2012 to Jun. 2012, she was a research associate in the Department of ECE at HKUST. From Mar. 2012 to Jun. 2012, she visited Prof. Stephen V. Hanly in Department of Electronic Engineering at Macquarie University as a Visiting Scholar. Since Jun. 2012, she has been a research associate in the Department of ECE at Northeastern University, US.

Abstract

1. Robust distributed control

Distributed algorithm design and analysis have been studied widely in wireless communications because of their applications in many areas, such as network utility maximization (NUM) and non-cooperative games. However, there is still a large gap between theoretical work and practical implementation. This is mainly due to the fact that although most algorithms result in good theoretical performance, they many not be practical due to several implementation issues. Therefore, it is very important to consider practical issues when modeling practical wireless communication systems and designing distributed algorithms. In this talk, we will discuss the design of robust distributed algorithms in wireless communication systems. For these control algorithms, we consider the practical cases when the system state information is imperfect or even unavailable, and the iterative message passing is imperfect and subject to signaling overhead constraints. The obtained robust distributed algorithms can achieve reasonable performance in practical systems.

2. Delay-aware cross-layer resource control

Cross-layer resource control has been strongly advocated due to its ability to improve system performance, by exploiting the use of the channel state information (CSI) from the physical layer. There is plenty of literature on cross-layer resource control to improve physical layer performance metrics such as throughput, SINR and BER. The resulting cross-layer resource control polices are adaptive to the CSI only. However, a typical assumption is that the transmitters have infinite backlog, and the information flows are delay-insensitive. Current practical applications, such as streaming audio, streaming video, and interactive gaming, are delay-sensitive. These applications have bursty arrivals and queueing at the transmitter side. Therefore, it is also very important to consider the delay performance in the design of resource control policies in wireless communication systems. In this talk, we will discuss delay-aware cross-layer resource control to support delay-sensitive applications in wireless communications systems. The derived resource control polices are adaptive to both the CSI and the queue state information (QSI), and can achieve good delay performance with low complexity so as to support delay-sensitive services in practical systems.