THE CHINESE UNIVERSITY OF HONG KONG
Institute of Network Coding
and
Department of Information Engineering
Seminar

Quantifying and Achieving the Capacity of Wireless 1-Hop Network Coding: A code-Alignment-Based Approach
by
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Date : **4 June, 2010 (Friday)**
Time : **11:00 am - 12:00 pm**
Venue: **Room 833, Ho Sin Hang Engineering Building**
The Chinese University of Hong Kong

Abstract

One-hop wireless network coding mixes packets of multiple unicast sessions, which has drawn significant attentions in the system-level wireless networking community due to its inherent low complexity of operating within a local neighborhood. Two representative schemes are (i) The ``XOR in the air'' scheme for the wireless cross topologies, and (ii) Network coding for the downlink direction of wireless access point network.

In this talk, we quantify the Shannon capacities of the above two schemes by deriving new outer and inner bounds that meet in almost all practical scenarios. The new capacity-achieving schemes are based on the concept of ``code alignment,'' a novel interference alignment technique in the finite field, which can be easily translated to practical intersession network coding protocols. The capacity results enable direct and comprehensive comparison of the throughput benefits of network coding and those of other competing techniques, such as cross-layer optimization and opportunistic routing. The capacity results can also be used as a benchmark for evaluating the efficiency of practical protocols.

This is joint work with Y. Charlie Hu, Dimitrious Koutsonikolas, Abdallah Khreishah (Purdue), and Ness Shroff (The OSU).

Biography

Chih-Chun Wang is currently an Assistant Professor of the School of Electrical and Computer Engineering of Purdue University. He received the B.E. degree in E.E. from National Taiwan University, Taipei, Taiwan in 1999, the M.S. degree in E.E., the Ph.D. degree in E.E. from Princeton University in 2002 and 2005, respectively. He worked in Comtrend Corporation, Taipei, Taiwan, as a design engineer in 2000 and spent the summer of 2004 with Flarion Technologies, New Jersey. In 2005, he held a post-doctoral researcher position in the Electrical Engineering Department of Princeton University. He joined Purdue University as an Assistant Professor in 2006. His current research interests are in the graph-theoretic and algorithmic analysis of iterative decoding and of network coding. Other research interests of his fall in the general areas of networking, optimal control, information theory, detection theory, and coding theory.

Dr. Wang received the National Science Foundation Faculty Early Career Development (CAREER) Award in 2009.

* ALL ARE WELCOME **

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