



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



## Lattice-Partition-Based Physical-Layer Network Coding over GF(4)

by

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**Date : 26 June 2013 (Wednesday)**  
**Time : 2:30 - 3:30 pm**  
**Venue : Room 1009, William M. W. Mong Engineering Building**  
**The Chinese University of Hong Kong**

### Abstract

In this talk, we study lattice-partition-based physical layer network coding (LNC) over the finite field GF(4), whose quaternary constellation has practical interests. The optimal dither method in terms of energy efficiency is first derived for LNC over GF(4), and it is shown to save 1/3 average transmission power. Next, LNC design from linear codes over GF(4) is investigated. Explicit connection between parameters of the linear code and of the corresponding LNC is established. The construction method is further extended to design LNCs from linear codes over a general finite field GF( $4^m$ ). As design examples, LNCs constructed from convolutional, BCH, and Reed-Solomon codes are presented and analyzed. It is illustrated that these LNCs can provide up to 8 dB nominal coding gain.

### Biography

Jinhong Yuan received the B.E. and Ph.D degrees in electronics engineering from Beijing Institute of Technology, Beijing, China, in 1991 and 1997, respectively. From 1997 to 1999 he was a Research Fellow at the School of Electrical Engineering, the University of Sydney, Sydney, Australia. In 2000 he joined the School of Electrical Engineering and Telecommunications, the University of New South Wales, Sydney, Australia, where he is currently a Professor for Telecommunications of the school. He has published two books, two book chapters and over 150 papers in telecommunications journals and conference proceedings. His current research interests include error control coding and information theory, communication theory, and wireless communications.

**\*\*ALL ARE WELCOME \*\***