



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



## Duality of Channel Encoding and Decoding for Rate-1 Convolutional Codes

by

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**Date : 28 March 2012 (Wednesday)**  
**Time : 11:00am -12:00 pm**  
**Venue : Room 833, Ho Sin Hang Engineering Building**  
**The Chinese University of Hong Kong**

### Abstract

In this talk, I will revisit the forward, backward and bidirectional Bahl-Cocke-Jelinek-Raviv (BCJR) soft-input soft-output (SISO) maximum a posteriori probability (MAP) decoding process of rate-1 convolutional codes. From this we establish some interesting duality properties between encoding and decoding of rate-1 convolutional codes. We observe that the forward and backward BCJR SISO MAP decoders can be simply represented by their dual SISO channel encoders using shift registers in the complex number field. Similarly, the bidirectional MAP decoding can be implemented by linearly combining the outputs of the dual SISO encoders of the respective forward and backward decoders. The dual encoder structures for various recursive and non-recursive rate-1 convolutional codes are derived.

### Biography

Yonghui Li received his Ph.D degree in November 2002 from Beijing University of Aeronautics and Astronautics. He joined the University of Sydney as a research fellow in 2003. He is now an associate professor in School of Electrical and Information Engineering, the University of Sydney. He is also currently the Australian ARC Queen Elizabeth II Fellow. His current research interests are in the area of wireless communications, with a particular focus on channel coding techniques, iterative receiver design, wireless network coding, cooperative communications, and recently on smart grid communications.

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

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