



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



**Relative Generalized Rank Weight of Linear Codes and
Its Applications to Network Coding**

by

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Date : 15 March 2013 (Friday)
Time : 2:30 - 3:30 pm
Venue : Room 833 , Ho Sin Hang Engineering Building
The Chinese University of Hong Kong

Abstract

By extending the notion of minimum rank distance, this talk introduces two new relative code parameters of a linear code C_1 of length n over a field extension and its subcode C_2 . One is called the relative dimension/intersection profile (RDIP), and the other is called the relative generalized rank weight (RGRW). We clarify their basic properties and the relation between the RGRW and the minimum rank distance. As applications of the RDIP and the RGRW, the security performance and the error correction capability of secure network coding, guaranteed independently of the underlying network code, are analyzed and clarified.

If there is enough time, this talk also includes the following: Silva and Kschischang showed the existence of a secure network coding in which no part of the secret message is revealed to the adversary even if any $\dim C_1 - 1$ links are wiretapped, which is guaranteed over any underlying network code. However, the explicit construction of such a scheme remained an open problem. We solve this open problem by proposing a new scheme and clarifying its performance with the RDIP and the RGRW. This is a joint work with J. Kurihara and T. Uyematsu. Manuscript available from <http://arxiv.org/abs/1301.5482>

Biography

Ryutaroh Matsumoto was born in Nagoya, Japan, on November 29, 1973. He received the B.E. degree in computer science, the M.E. degree in information processing, and the Ph.D. degree in electrical and electronic engineering, all from Tokyo Institute of Technology, Japan, in 1996, 1998, 2001, respectively. He was an Assistant Professor from 2001 to 2004, and has been an Associate Professor since 2004 in the Department of Communications and Computer Engineering of Tokyo Institute of Technology, while he served as a Visiting Professor for Department of Mathematical Sciences, Aalborg University, Denmark in 2011. His research interest includes information theoretic security, network coding, quantum information theory, and error-correcting codes. Dr. Matsumoto received the Young Engineer Award from IEICE and the Ericsson Young Scientist Award from Ericsson Japan in 2001. He received the Best Paper Awards from IEICE in 2001, 2008 and 2011.

**** ALL ARE WELCOME ****

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