



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



Ordered Statistics Decoding for Linear Block Codes over Intersymbol Interference Channels

by

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Date : 17 March 2011 (Thursday)
Time : 11:00 am -12:00 pm
Venue : Room 833, Ho Sin Hang Engineering Building
The Chinese University of Hong Kong

Abstract

Ordered statistics decoders (OSD) have been shown to be the best-performing decoders of general linear block codes over memoryless channels, though at a high computational cost. OSD techniques are soft-decoding techniques that rely on keeping a list of hypothesized codewords ordered by their reliabilities. However, in channels with memory such as the intersymbol interference (ISI) channel, ordering and managing error-even reliabilities is not a trivial task. In this talk we investigate applications of OSD techniques on intersymbol interference (ISI) channels. We show that OSD techniques may be applied to ISI channels after appropriate modifications to the Viterbi algorithm (for computing reliabilities of error events) and the Battail algorithm (for managing ordered error events). We demonstrate the performance on an appropriately modified Box-and-Match decoder for ISI channels. In the second part of the talk, we address analytical expressions for joint distribution functions of ordered reliabilities over ISI channels. Obtaining these expressions in channels with memory is a very difficult task. Here we show that if we replace the (soft) Viterbi detector by the Max-Log-Map detector, we can derive analytic expressions for joint ordered statistics (joint probability density functions and cumulative distribution functions) on ISI channels.

Biography

Aleksandar Kavcic received the Dipl. Ing. degree in Electrical Engineering from Ruhr-University, Bochum, Germany in 1993, and the Ph.D. degree in Electrical and Computer Engineering from Carnegie Mellon University, Pittsburgh, Pennsylvania in 1998. Since 2007 he has been with the University of Hawaii, Honolulu where he is presently Associate Professor of Electrical Engineering. Prior to 2007, he was in the Division of Engineering and Applied Sciences at Harvard University, as Assistant Professor of Electrical Engineering from 1998 to 2002, and as John L. Loeb Associate Professor of Natural Sciences from 2002 to 2006. While on leave from Harvard University, he served as Visiting Associate Professor at the City University of Hong Kong in the Fall of 2005 and as Visiting Scholar at the Chinese University of Hong Kong in the Spring of 2006. Prof. Kavcic received the IBM Partnership Award in 1999 and the NSF CAREER Award in 2000. He is a co-recipient, with X. Ma and N. Varnica, of the 2005 IEEE Communications Society Best Paper Award in Signal Processing and Coding for Data Storage. He served as Associate Editor of the *IEEE Transactions on Information Theory*, and as Guest Editor for *IEEE Signal Processing Magazine* and *IEEE Journal on Selected Areas in Communications*, all in the decade between 2000 and 2010.

****ALL ARE WELCOME ****

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