IEEE Kitchener-Waterloo

"Minimum Transmit Redundancy FIR Precoder-Equalizer System Design"

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Date: Friday May14, 2004
Time:10:00 am
Location: MC 5158

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All Are Welcome!

Abstract

The communication problem caused by selective fading channel can be alleviated by precoding the signal to be transmitted. The precoder adds redundancy to the transmitted signal that can be exploited by zero-forcing equalizer. However, the inserted redundant signal consumes channel bandwidth, which affects the system throughput. In this talk we will discuss ways to reduce the amount of inserted redundancy to maximize system throughput. The minimum amount of redundancy and the corresponding requirements for the existence of FIR zero-forcing precoder-equalizer system are characterized. A systematic design method is proposed together with various design criteria for the precoder-equalizer system will be discussed under the non-maximally decimated filter banks framework. Extension to MIMO communication systems will also be discussed. Fianlly, a jointly optimized precoder-equalizer design method, a FIR zero-forcing equalizer with successive interference cancellation, and other prec! oder-equalizer optimization are presented together with simulation results that show signification improvement in lowering the bit error rate can be obtained.

Biography

Chi-Wah Kok received the B.Eng and MPhil degrees from the City University of Hong Kong in Electronic Engineering in 1990 and 1993 respectively. After working in several semiconductor companies which include Lattice Semiconductor, in 1993 to 1995, he joined the University of Wisconsin, Madison in 1995, and earned the MSc and PhD degrees in Electrical Engineering in 1996 and 1997 respectively. Upon graduation, he joined the SONY US Research Laboratory and Stanford University. Since 1999, he has been with the Department of Electrical and Electronic Engineering, Hong Kong University of Science and Technology as an assistant professor. He has published more than 100 archival papers in the area of signal processing with applications in multimedia and digital communications.