THE CHINESE UNIVERSITY OF HONG KONG

In Celebration of the 20th Anniversary of Faculty of Engineering

Institute of Network Coding
and
Department of Information Engineering
~ *Distinguished Lecture* ~

Dirty Paper Coding and Distributed Source Coding -
Dual Views of Combined Source and
Channel Coding
by
Prof. Max H. M. Costa
University of Campinas, Brazil

Distinguished Lecture
Date : **6 July 2011 (Wednesday)**
Time : **2:30 - 3:30pm**
Venue : **Room 1009, William M. W. Mong Engineering Building**
The Chinese University of Hong Kong

Abstract

Some communication systems have access to side information at the encoder or at the decoder. These models may benefit from combined source and channel coding techniques, exemplified by dirty paper coding and Wyner-Ziv coding. These dual problems have potential applications in various areas such as steganography, digital watermarking, cellular communications, cognitive radio, video coding and distributed source coding. In this talk we present a brief history of these problems, highlighting the notion of "binning", which gives rise to coset codes and other practical methods of joint source and channel coding. We show that binning is the dual of the quantization operation and illustrate the concepts with examples. We conclude with a discussion about practical applications of these problems and techniques involving cyclic codes and lattice codes.

Biography

Max H. M. Costa graduated as an Electrical Engineer at the University of Brasília in 1974. He received his Master Degree in Electrical Engineering from the University of Campinas (Unicamp) in 1977, the Master in Statistics from Stanford University in 1979, the Ph.D. in Electrical Engineering from Stanford University in 1983, and the "Livre Docência" in Electrical Engineering from Unicamp in 1998. He was a Researcher at the Brazilian National Institute of Space Research (INPE), in São José dos Campos, SP, Brazil, from 1983 to 1988 and at the General Electric Corporate Research and Development Center, in Schenectady, NY, USA, from 1988 to 1993. From 1993 to 1994 he was a Senior Research Associate at NASA's Jet Propulsion Laboratory, in Pasadena, CA, USA. Since 1995 he has been a Faculty Member at Unicamp, where he is currently an Associate Professor. From April 2007 to April 2011 he was the Director of the School of Electrical and Computer Engineering (FEEC) of Unicamp. He is a Senior Member of the IEEE, and a Senior Member of the Brazilian Telecommunications Society (SBrT). He is a member of the Board of Governors (BoG) of the IEEE Information Theory Society over the period 2010-2012. He is currently a member of the Awards Committee, the Membership and Chapters Committee, and a Distinguished Lecturer of the Information Theory Society. His research interests lie in Shannon theory, source and channel coding, and digital television. His papers have received over 2500 citations. He is better known for his paper "Writing on dirty paper", published in 1983, a recipient of close to 2000 citations according to Google Scholar.

~ ALL ARE WELCOME ~

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