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

Strong Converses in Information Theory
by
Professor Pierre Moulin
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Date   :   **16 March, 2010 (Tuesday)**

Time   :   **4:30 pm - 5:30 pm**

Venue   :   **Room 833, Ho Sin Hang Engineering Building**

  The Chinese University of Hong Kong

Abstract
Capacity theorems in information theory are proved in two steps: first demonstrate achievability of capacity by some coding scheme (usually a random coding scheme), then prove the converse, that is, there exists no code that performs reliably (error probability vanishes) at transmission rates above capacity.

The usual approach for the second step is the so-called weak converse based on Fano's inequality. An alternative and elegant approach, introduced by Wolfowitz in 1959, is a strong converse, which is essentially based on sphere packing arguments. The strong converse proves that any code with rate greater than capacity has error probability tending to 1. The weak converse merely proves that such codes have error probability bounded away from 0.

A more serious weakness of the weak converse approach is that for some problems, there is a gap between the lower and upper bounds on capacity provided by the coding scheme and by the weak converse. In some cases, the strong converse yields the desired match between lower and upper bounds. Two such examples will be given in this talk.

Biography
Pierre Moulin received his doctoral degree from Washington University in St. Louis in 1990, after which he joined at Bell Communications Research in Morristown, New Jersey, as a Research Scientist. In 1996, he joined the University of Illinois at Urbana-Champaign, where he is currently Professor in the Department of Electrical and Computer Engineering, Research Professor at the Beckman Institute and the Coordinated Science Laboratory, affiliate professor in the Department of Statistics, and Sony Faculty Scholar.

His fields of professional interest include image and video processing, compression, statistical signal processing and modeling, media security, decision theory, and information theory.

Dr. Moulin has served on the editorial boards of the IEEE Transactions on Information Theory, the IEEE Transactions on Image Processing. He currently serves on the editorial boards of the Proceedings of IEEE and of Foundations and Trends in Signal Processing. He was co-founding Editor-in-Chief of the IEEE Transactions on Information Forensics and Security (2005-2008), member of the IEEE Signal Processing Society Board of Governors (2005-2007), and has served IEEE in various other capacities.

He received a 1997 Career award from the National Science Foundation and an IEEE Signal Processing Society 1997 Senior Best Paper award. He is also co-author (with Juan Liu) of a paper that received an IEEE Signal Processing Society 2002 Young Author Best Paper award. He was 2003 Beckman Associate of UIUC's Center for Advanced Study and plenary speaker for ICASSP 2006 and several other conferences. He is an IEEE Fellow.

** ALL ARE WELCOME **

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