THE UNIVERSITY  OF HONG KONG

Institute of Mathematical Research
Department of Mathematics

PROBABILITY AND INFORMATION THEORY SEMINAR

June 3, 2014 (Tuesday)
Room 309, Run Run Shaw Bldg., HKU

Professor Pablo Piantanida

SUPELEC, France

A Proof of the Generalized Markov Lemma with Countable Infinite Alphabets

10:40 - 11:10am

Abstract

The Generalized Markov Lemma (GML) has been used in the information-theoretic proofs of several distributed source coding problems. This result establishes sufficient conditions for the (non-product) probability measure of the source reproductions (quantizations) to have the required measure concentration property. In this talk, we present an alternative approach to extend the GML to countable infinite alphabets. We approach this problem via a large deviation analysis of the multinomial characterization of empirical probability measures, which allows us to bound the probability of the relevant typicality event. Compared to existing proofs for finite alphabets, our technique is simpler and self-contained. It also offers bounds on the asymptotic tail probability of the typicality event, providing a scaling law for a large number of encoders.

Joint work with Dr. Leonardo Rey Vega and Prof. Alfred Hero III.

Short biography: Pablo Piantanida received the B.Sc. and M.Sc degrees (with honors) in Electrical Engineering and Mathematics from the University of Buenos Aires (Argentina), in 2003, and the Ph.D. from the Paris-Sud University (France) in 2007. Since October 2007 he has joined in 2007 the Department of Telecommunications, SUPELEC, as an Assistant Professor in network information theory. His research interests include multi-terminal information theory, Shannon theory, cooperative communications, physical-layer security and distributed source coding.

Professor Sheng Yang

SUPELEC, France

Fading Broadcast Channels with State Feedback and An Open Problem on the Extremal Inequalities

11:30am - 12:00noon

Abstract

In this talk, we first propose capacity bounds on the two-user broadcast channel with state feedback. Using an extremal inequality on the differential entropies, we show that the inner bound is within a constant gap (around one bit) to the capacity region for a class of channel fading. In the rest of the talk, we will point out how the aforementioned extremal inequality fails for general fading channel. Finally, we provide a conjecture that would be adequate for the constant-gap result to hold in the general case.

Short biography: Sheng Yang received the B.E. degree in electrical engineering from Jiao Tong University, Shanghai, China, in 2001, and both the engineer degree and the M.Sc. degree in electrical engineering from École Nationale Supérieure des Télécommunications (ENST), Paris, France, in 2004, respectively. From 2004 to 2007, he worked as teaching and research assistant in the Communications and Electronics department in ENST. During the same period, he completed his Ph.D., graduating in 2007 from Université de Pierre et Marie Curie(Paris VI). From October 2007 to November 2008, he was with Motorola Research Center in Gif-sur-Yvette, France, as a senior staff research engineer. Since December 2008, he has joined the Telecommunications department at SUPELEC where he is currently an assistant professor. His research interests includes wireless communications and networks information theory. This meeting is hosted by the Institute of Mathematical Research, HKU.

All are Welcome