DEPARTMENT OF STATISTICS AND ACTUARIAL SCIENCE
THE UNIVERSITY OF HONG KONG

Seminar 1

Dr. Pascal BONDON

Research Director, Head of Signals Department
L2S, CNRS UMR8506, Gif-sur-Yvette, France

ASYMPTOTICS FOR LINEAR PREDICTORS OF LONG-MEMORY PROCESSES

Abstract

This talk assesses the performance of finite-sample linear predictors as compared to forecasts based on the infinite past in the context of long-range dependent time series. We introduce a semi-parametric class of long-memory processes which includes the popular fractional autoregressive moving average model, establishing some convergence results for the autoregressive expansion based on a finite number of past observations. In particular, we prove that the rest of the autoregressive expansion satisfies a central limit theorem whose rate of convergence does not depend on the long-memory parameter of the process but whose variance depends on this parameter. As a consequence, the mean square error of the forecasts obtained by truncating the autoregressive expansion depends only on the long-memory parameter and it is independent of any short-memory component of the model. Then, we study the effect of the mean estimation of the series on the convergence of the autoregressive expansion. We show that estimating the mean does not affect the rate of convergence. Simulation results with fractional autoregressive moving average time series show that the asymptotic rates obtained from the theory are very close to the rates reached in practice, even with a relative small numberof observations.

Seminar 2

Professor Frédéric PASCAL

L2S, CentraleSupelec, Gif-sur-Yvette, France

ROBUST COVARIANCE MATRIX ESTIMATION AND APPLICATIONS TO SIGNAL PROCESSING

Abstract

This talk deals with general problems of covariance matrix estimation with applications in signal processing. Under the widely used Gaussian assumption, the Sample Covariance Matrix (SCM) estimate provides optimal results in terms of estimation performance. However, when the observations turn to be non-Gaussian, the resulting performance of the SCM can be strongly degraded. To fill this gap, I will first introduce the general framework of the Robust Estimation Theory, with a particular focus on the Complex Elliptically Symmetric (CES) distributions and robust covariance matrix estimates. Then, recent results of the robust estimates performance are applied to radar detection as well as to Direction-Of-Arrival estimation. The second part of the presentation is devoted to the generalization of classical results on robust estimation in the context of Radom Matrix Theory in a large dimensional regime, i.e. where both the number of observations and their dimension tends to infinity at the same rate. Particularly, the performance improvement will be shown on signal processing applications.

on

Tuesday, March 24, 2015

(Refreshments will be served from 5:00 p.m. <u>outside Room 301 Run Run Shaw Building</u>)

Seminar 1: 5:15 p.m. – 5:45 p.m.
Seminar 2: 5:45 p.m. – 6:15 p.m.

at

Room 301, Run Run Shaw Building

<u>Visitors Please Note</u> that the University has limited parking space. If you are driving please call the Department at 3917 2466 for parking arrangement.

All interested are welcome