



THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY

Department of Mathematics

SEMINAR ON STATISTICS

**Clustering Multivariate Time Series
using Energy Distance**

By

Professor Richard A. Davis

Columbia University, USA

Abstract

A novel methodology is proposed for clustering multivariate time series data that is based on energy distance defined in Szekely and Rizzo (2013). Specifically, a dissimilarity matrix is formed using the energy distance statistic to measure separation between the finite dimensional distributions for the component time series. Once the pairwise dissimilarity matrix is calculated, a hierarchical clustering method is then applied to obtain the final clustering. This procedure is completely non-parametric as the dissimilarities between stationary distributions are directly calculated without making any model assumptions. In order to justify this procedure, asymptotic properties of the energy distance estimates are derived for general stationary and ergodic time series. The method is illustrated in a simulation study for various component time series that are either linear or nonlinear. Finally, the methodology is applied to two examples; one involves GDP of selected countries and the other is population size of various states in the U.S.A from 1900-1999. (This is joint work with Leon Fernandes and Konstantinos Fokianos.)

Biography

Professor Richard A. Davis is Howard Levene Professor of Statistics at Columbia University. He is a former president of the Institute of Mathematical Statistics. He is a fellow of the Institute of Mathematical Statistics and the American Statistical Association, and is an elected member of the International Statistical Institute. He is co-author (with Peter Brockwell) of the bestselling books, "Time Series: Theory and Methods", "Introduction to Time Series and Forecasting", and the time series analysis computer software package, "ITSM2000". In 1998, he won (with collaborator W.T.M Dunsmuir) the Koopmans Prize for Econometric Theory.

Date : 24 April 2024 (Wednesday)

Time : 3:00pm-4:00pm

Venue : Room 2126D (Lift 19)

All are Welcome!