RUTGERS UNIVERSITY
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Seminar

Speaker: Wanli Min, IBM

Title: Robust Statistical Inference on Spatial-temporal Processes with Applications

Date: Wednesday January 28, 2009

Time: 3:20 PM

Place: 552 Hill Center

Abstract

In classical time series analysis framework, it is often assumed that the innovation sequence are white noise. Unfortunately in many real applications the data presented clearly violates this assumption. For instance, in some financial time series models the mean equation follows traditional ARIMA model but the innovations are assumed certain conditional heteroscedasticity. In spite of this violation, many inference procedures established for processes with white noise innovations are still widely applied to such processes whose innovation sequence are dependent. In this work, we will establish asymptotic distributions for conventional statistics (partial ACF, sample ACF etc) for such processes with dependent innovations. The framework we adopted allows us to prove invariance principle under mild conditions which are also easy to verify. The asymptotics are shown to be different from conventional ones. Consequently the conventional statistics are shown to give inconsistent inference results in model identification and model selection for such processes. In particular, we will illustrate that the widely used model selection criteria, such as AICc, AIC and BIC,fail to live up to their respective nice properties originally discovered in the context of classical time series with white noise innovations. We propose a modified AIC and show its efficiency and robustness through simulations. We will conclude with a real application to real-time forecasting of network flow with composite periodicity, time-varying spatial correlations, and autoregressive conditional heteroscadestic pattern.