MICHIGAN STATE UNIVERSITY
Department of Statistics and Probability

COLLOQUIUM

Soutir Bandyopadhyay

Lehigh University

A Frequency Domain Empirical Likelihood Method for Irregularly Spaced Spatial Data

Tuesday, February 11, 2014
10:20 a.m. - 11:10 am
Refreshments 10:00 am
C405 Wells Hall

Abstract:

This paper develops empirical likelihood methodology for irregularly spaced spatial data in the frequency domain. Unlike the frequency domain empirical likelihood (FDEL) methodology for time series(on a regular grid), the formulation of the spatial FDEL needs special care due to lack of the usual orthogonality properties of the discrete Fourier transform for irregularly spaced data and due to presence of nontrivial bias in the periodogram under different spatial asymptotic structures. A spatial FDEL is formulated in the paper taking into account the effects of these factors. The main results of the paper show that Wilk's phenomenon holds for a scaled version of the logarithm of the proposed empirical likelihood ratio statistic in the sense that it is asymptotically distribution free and has a chi-squared limit. As a result, the proposed spatial FDEL method can be used to build nonparametric, asymptotically correct confidence regions and tests for covariance parameters that are defined through spectral estimating equations, for irregularly spaced spatial data. In comparison to the more common studentization approach, a major advantage of our method is that it does not require explicit estimation of the standard error of an estimator, which is itself a very difficult problem as the asymptotic variances of many common estimators depend on intricate interactions among several population quantities, including the
spectral density of the spatial process, the spatial sampling density and the spatial asymptotic structure.

To request an interpreter or other accommodations for people with disabilities, please call the Department of Statistics and Probability at 517-355-9589.