

MICHIGAN STATE UNIVERSITY
Department of Statistics and Probability

COLLOQUIUM

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Robust Estimation and Fitting of Reduced Rank Models to Large Spatial Datasets

Tuesday, February 23, 2016
10:20 a.m. - 11:10 am
Refreshments 10:00 am
C405 Wells Hall

Abstract

Reduced rank spatial models (RRSM) are popular in modeling spatial covariances for large datasets. The key idea is to model the spatial covariance through a known matrix of basis functions and the covariance of a reduced dimensional latent process. When datasets exhibit departures from the normal distribution, likelihood based approaches such as EM algorithm will not provide reasonable estimates. Method of Moments estimation is a distribution-free, two-step algorithm, but remains susceptible to contamination. This motivates development of robust methods for RRSMs. We propose a method based on an empirical binned covariance matrix using the median absolute deviations. Then the L1 norm between this empirical covariance and the model covariance is minimized. The proposed estimate performs uniformly better than Method of Moments estimates. The consistency of the proposed estimates is demonstrated theoretically, and through simulation. The proposed methods are illustrated on cloud data obtained from NASA's Terra satellite. This is joint work with Dr. Casey M. Jelsema and Dr. Joseph W. McKean.

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