The University of Chicago
Department of Statistics

Seminar Series

DEBASHIS PAUL
Department of Statistics
University of California, Davis

Limiting Spectral Distribution of a Separable Covariance Matrix

MONDAY, October 8, 2007 at 4:00 PM
133 Eckhart Hall, 5734 S. University Avenue
Refreshments following the seminar in Eckhart 110.

ABSTRACT

In the first part of this talk, based on joint work with Jack Silverstein, we shall consider a class of matrices of the form $S_n = \frac{1}{n} A_n Z B_n Z^T A_n$, where A_n is a $p \times p$ positive definite matrix, B_n is an $n \times n$ diagonal matrix with positive digaonal elements, and Z is a $p \times n$ matrix of i.i.d. entries with mean 0, variance 1 and with enough moments. We shall show that under the assumption that $\frac{p}{n}$ converges to some finite, positive constant, the empirical distribution of the eigenvalues of S_n converges a.s. to a nonrandom limit, that can be described in terms of functional equations. Further, under appropriate conditions on A_n and B_n, with probability 1, there is no eigenvalue in any closed subinterval outside the support of the limiting empirical spectral distribution.

As a related problem, we consider the problem of estimating the leading eigenvectors of A_n, when the eigenvalues of A_n are all the same except for a finite number that are larger. For this "spiked" separable covariance structure, asymptotic Gaussian limits for leading sample eigenvalues and certain projections of the sample eigenvectors will be obtained when the corresponding population eigenvalues are above a certain threshold.

Please send email to Mathias Drton (drton@galton.uchicago.edu) for further information. Information about building access for persons with disabilities may be obtained in advance by calling Karen Gonzalez (Department Administrator and Assistant to Chair) at 773.702.8335 or by email (karen@galton.uchicago.edu).