

Data Science Seminar
Hosted by Department of Mathematical Sciences

- Date: Tuesday, November 26, 2017
- Time: 12:00pm - 1:00pm
- Room: WH-100E
- Speaker: Wei Yang (Binghamton University)
- Title: Random Covariance Matrix and the Marchenko-Pastur law

Abstract

Let x be a p -dimensional centered random vector, with some unknown covariance matrix Σ . Let x_1, \dots, x_n be n i.i.d copies of x , we can form

$S = \text{sample mean of } x_i x_i^T$'s

Which is an example of a $p \times p$ random matrix. When $\{x_i\}_{i \in \{n\}}$ are realized, S is just a sample covariance matrix. If n is large, S by the Law of Large number is a good estimator for Σ . When the size n is limited, but n, p are comparable, the classical Marchenko-Pastur (MP) Law says that, the eigenvalues of S follows roughly the MP distribution. In this talk, we are going to use the Stieltjes Transformation (Resolvent) method to prove a version of the MP Law. The focus will be on the method of proof, a common technique in the theory of Random Matrices.

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