THE UNIVERSITY OF HONG KONG

Institute of Mathematical Research
Department of Mathematics

LECTURES ON RANDOM MATRIX THEORY

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Lecture 3: Unitary group, Haar measure and longest increasing subsequence

March 17, 2017 (Friday), 3:30 – 5:00pm

Abstract: The symmetric group of permutations of first n integers and the unitary group of n by n unitary matrices have many deep connections. One of these has been discovered in the late 90's by A.M. Odlyzko and E.M. Rains which expresses the distribution of the length of the longest subsequence in a random permutation through the Haar measure on the unitary group. Exploiting this connections and using tools from random matrix theory, a work by J. Baik, P.A. Deift and K. Johansson has led to a profound understanding of the distribution, solving completely a conjecture made in 1972 by S. M. Ulam. These results will be discussed in this lecture.

Lecture 4: Sample covariance matrices and high-dimensional statistics

March 24, 2017 (Friday), 3:30 – 5:00pm

Abstract: Sample covariance matrices is a basic object in multivariate statistical analysis. Many inference methods are based on the spectral properties, namely eigenvalues and eigenvectors, of these matrices. This lecture will first give a survey of recent results from random matrix theory on spectral properties of these matrices. Then a few example of their application to modern high-dimensional statistics such as hypothesis testing or parameter estimation will be presented.

Room 210, Run Run Shaw Bldg., HKU

All are welcome