RANDOM DAYS
31ST AUGUST–1ST SEPTEMBER, 2017
L^∞, 5TH FLOOR, KOLMOGOROV BHAVAN

August 31

11:00–11:40: *Arijit Chakrabarty, ISI Kolkata*

Title: Spectra of adjacency matrices of random graphs.

Abstract: We shall talk about the limiting spectral distribution of adjacency matrices of inhomogeneous Erdös-Renyi random graphs in the supercritical regime. This is a recently started joint work with Rajat Subhra Hazra and Frank den Hollander.

11:50–12:30: *Anish Sarkar, ISI Delhi*

Title: Coalescing Time of random walks to Convergence of networks.

Abstract: We compute, by elementary methods, the expectation of the coalescing time for at least one pair of random walks to meet starting with three random walks. We generalize this to a upper bound for 3 paths whose evolution is given by a Markov chain. We show that these estimate of the expected coalescing time can be used to prove convergence of directed networks to the Brownian Web.

12:30–13:10: *Alok Goswami, ISI Kolkata*

Title: Energy Distance for probabilities.

Abstract: I will discuss a recently developed concept of energy distance between probabilities on euclidean spaces and its possible generalization to metric spaces. If time permits, I will also mention its relations with kernel-based distance.

14:30–15:10: *Rajat Subhra Hazra, ISI Kolkata*

Title: Scaling limit of the discrete membrane model in any dimension.

Abstract: The membrane model turns out to be an important model for random interface. Unlike the more famous discrete Gaussian free field, the model lacks a random walk representation for covariance structure and FKG properties. We show that field, when lattice is rescaled, converges to its continuum counter part. The finite dimensional convergence comes using the finite element methods developed by Vidar Thomée. The tightness becomes a much more intricate issue to tackle due to the appearance of the biharmonic operator. In this talk we describe the

explicit construction of continuum Membrane model. We discuss some potential applications of this convergence. If time permits we conjecture on the continuity and conformal properties of the limiting field. The talk is based on an ongoing work with Alessandra Cipriani (University of Bath) and Biltu Dan (ISI, Kolkata).

15:10–15:50:*Arindam Chatterjee, ISI Delhi*

Title: Pseudo-likelihood and bootstrapped pseudo-likelihood inference in binary regression model with misclassified responses.

Abstract: Misclassification of binary responses, if ignored, may severely bias the maximum likelihood estimators (MLE) of binary regression parameters. For such data, a binary regression model incorporating misclassification probabilities has been extensively used by researchers in different application contexts. The model may, however, suffer from serious identifiability problem depending on the locations of misclassified data points. To overcome this problem, often, internal validation data are collected in addition to the data subject to classification errors for improved inference on the model parameters. Unfortunately, however, no theory is available to address this inferential problem. In this paper, we propose a maximum pseudo-likelihood method of estimation, and develop rigorous asymptotic theory for the resulting estimator under standard assumptions. We also provide consistency results for the bootstrapped pseudo-likelihood estimator in this setting. Theoretical results are illustrated with a short numerical study and application to a real data set. (Joint work with T. Bandyopadhyay (IIM-A) and S. Adhya (W. B. State Univ.))

16:10–16:50: *Anil Ghosh, ISI Kolkata*

Title: On Perfect Clustering of High Dimensional Data.

Abstract: Popular clustering algorithms based on usual distance functions (e.g., Euclidean distance) often suffer in high dimension, low sample size situations, where concentration of pairwise distances has adverse effects on their performance. We propose to use a dissimilarity measure based on the data cloud, called MADD, which takes care of this problem. MADD uses the distance concentration phenomenon to its advantage, and as a result, clustering algorithms based on MADD usually perform better for high dimensional data.

We also address the problem of estimating the number of clusters. This is a challenging problem in cluster analysis, and several algorithms are available for it. We show that many of these existing algorithms have superior performance in high dimensions when MADD is used instead of Euclidean distance. We also construct a new estimator based on penalized Dunn index and prove its high dimensional consistency.

(Joint work with Soham Sarkar)

16:50–17:30: *Probal Chaudhuri, ISI Kolkata*

Title: Mismeasure of man and statistics.

Abstract: I am reading something interesting and will share that with the audience. Hopefully, it will refresh people a bit after a long day loaded with technical talks.

September 01:
11:00–11:40: *Antar Bandyopadhyay, ISI Delhi*

Title: Random Recursive Tree, Branching Markov Chains and Urn Models.

Abstract: In this talk, we will establish a connection between random recursive tree, branching Markov chain and urn model. Exploring the connection further we will derive fairly general scaling limits for urn models with colors indexed by a Polish Space and show that several exiting results on classical/non-classical urn schemes can be easily derived out of such general asymptotic. We will further show that the connection can be used to derive exact asymptotic for the sizes of the connected components of a "random recursive forest", obtained by removing the root of a random recursive tree.

This is a joint work with Debleena Thacker.

11:50–12:30: *Krishanu Maulik, ISI Kolkata*

Title: Urn Models using Stochastic Approximation.

Abstract: We consider an urn model where the replacement matrices are random. The replacement matrices need neither be independent, nor identically distributed. However, we assume that the replacement matrices are independent of the color drawn in the same round conditioned on the entire past. We also assume the matrices to have only first moment finite, unlike the usual second moment assumption in the literature. We further require the conditional expectation of the replacement matrix given the past to be close to an (not necessarily nonrandom) irreducible matrix in some appropriate sense. We do not require any of the matrices to be balanced.

When the replacement matrices have $p > 1$ moments finite, we prove almost sure convergence of the proportion vector, while the convergence is in probability when the replacement matrices have only first moment finite. We also consider the growth rates of composition vectors and count vectors. We use stochastic approximation to analyze the model. We develop a new version of stochastic approximation with random step size and driving function. The related differential equation is of Lotka-Volterra type and can be analyzed directly.

This is a joint work with Ujan Gangopadhyay.

12:30–13:10: *Siva Athreya, ISI Bangalore*

Title: Harnack Inequality for non-local Schrödinger Operators.

Abstract: In this talk we shall introduce non-local operators that come from jump diffusions and prove a Harnack Inequality for the Schrödinger operator. This is joint work with Koushik Ramachandran.