SHORT PRESENTATIONS

A 15 minute session (11:50-12:10 and 16:20-16:40) is reserved for asking questions to the speakers. Short lectures will follow this session without a break in between.

Date	12:10-12:25	12:30-12:45	16:40-16:55	17:00-17:15
6th	Arijit Chakrabarty	Souvik Roy	Krishanu Maulik	Veeeraruna Kavitha
7th	Anish Sarkar	Sandeep Juneja	Kuttykrishnan A.P	Partha Sarathi Dey
9th	Abhay Gopal Bhatt	Ananya Lahiri	Srilakshminarayana.Gali	Sreekar Vadlamani
10th	Rajesh Sundaresan	Rahul Roy	–	–

ABSTRACTS FOR SHORT PRESENTATIONS - 6TH DEC

Arijit Chakrabarty [ISI, Delhi]

Title : *From Random Matrices to Long Range Dependence*
Abstract : Random matrices whose entries come from a stationary Gaussian process are studied. The limiting behavior of the eigenvalues as the size of the matrix goes to infinity is the main object of interest in this talk. It will be shown that the absolutely continuous and discrete components of the spectral measure of the stationary process contribute to the limiting behavior of the eigenvalues in different ways. Therefore, this helps to define a boundary between short and long range dependence of a stationary Gaussian process, in the contextof random matrices. This is a joint work with Rajat S. Hazra andDeepayan Sarkar. **Souvik Roy** [ISI,]

Title : *Oriented Percolation with backbend*
Abstract : Backbends in percolation process are the flows that go against the percolation direction. Backbends are proved to be important enough to be given special consideration in different physical models involving particle system. In this paper, we investigate the effect of backbends on the limiting direction in a bond percolation process. We show the limiting direction gets strictly bigger as the number of backbends increases.

Krishanu Maulik [ISI, Kolkata]

Title : *Bit torrent*
Abstract : I shall describe a model for the P2P system proposed by Hajek and Zhu and pose some associated problems.

Veeeraruna Kavitha [IIT Bombay, Mumbai]

Title : *Interactions between Random Walk and Poisson Point process*
Abstract : We consider a Poisson Point process on a line and a particle moving in the same line according to a random walk or a Brownian motion. Our is to study various interactions between

them. For example, we like to study the stationary distribution of the nearest point in thePoint process and the random walk particle. We would like to study theaverage time taken by the particle to switch from one Vornoi cell toanother and so on.

ABSTRACTS FOR SHORT PRESENTATIONS - 7TH DEC

Anish Sarkar [ISI, Delhi]
Title : *Non-monotonicity in Frog Model*

Abstract: I will introduce the frog model and show that the critical probability for the frog model on a graph is not a monotonic function of the graph.

Sandeep Juneja [TIFR, Mumbai]

Title : *Rare Event Simulation of Heavy Tailed Random Walks - A New Approach*
Abstract : Rare event simulation involving heavy tailed random variables finds wide application in queuing, insurance as well as finance. We develop state-independent importance sampling based efficient simulation techniques for two commonly encountered and basic rare event probabilities associated with a random walk S_n with regularly varying heavy-tailed increments; namely, the level crossing probabilities when the increments of S_n have a negative mean, and the large deviation probabilities $\Pr\{S_n > b\}$, as both n and b increase to infinity for the zero mean random walk. Exponential twisting based state-independent methods, which are effective in efficiently estimating these probabilities for light-tailed increments are not applicable when these are heavy-tailed. To address the latter case, more complex and elegant state-dependent efficient simulation algorithms have been developed in the literature over the last ten years. We propose that by suitably decomposing these rare event probabilities into a dominant and further residual components, simpler *state-independent* importance sampling algorithms can be devised for each component resulting in composite unbiased estimators with a desirable asymptotically vanishing relative error property. When the increments have infinite variance, there is an added complexity in estimating level crossing probabilities as even the well-known zero variance estimators have an infinite expected termination time. We adapt our algorithms so that this expectation is finite while the estimators remain strongly efficient.

Kuttykrishnan A.P. [Sir Syed College] *Geometric Stable Distribution and process*
Abstract : Geometric stable distributions received much attention in recent years and their applications in different fields ranges from reliability to financial mathematics are well established by several researchers. It can be used in modeling peaked and heavy tailed observations that may be a result of a random number of independent innovations. Although the theory and applications of geometric stable distributions is well developed and appeared in many literature in recent years, their applications in time series modeling are not developed. Present talk is on autoregressive model using geometric stable distributions as marginal distributions.

Partha Sarathi Dey [University of Warwick]
Title : *Phase diagram for (1+1)-dimensional directed polymer in intermediate disordered iid random environment*

Abstract: We consider the model of directed polymer of length n in iid random environment with inverse temperature $n^{-\gamma}$ for some $\gamma \geq 0$ and weights having tail behavior $x^{-\alpha}$ for some $\alpha > 0$. The fluctuation exponent χ and transversal exponent ξ are defined such that fluctuation of the log-partition function is of the order n^{χ} and endpoint fluctuation of a typical polymer path is of

the order n^{ξ}. We find and explain the phase diagram for the exponents in the α - γ plane. Based on ongoing work with Nikos Zygouras and Xue-Mei Li.

ABSTRACTS FOR SHORT PRESENTATIONS - 9TH DEC

Abhay Gopal Bhatt [ISI, Delhi]

Title : *Robustness issues of the optimal filter*

Ananya Lahiri [CMI, Chennai]

Title : *Integrated volatility estimation for 'fractional Brownian motion driven stock price model*
Abstract : Fractional Brownian Motion (FBM) has been introduced as a replacement of Brownian Motion (BM) to model long range dependence of stock price data. Integrated volatility (IV) is a measure of variability of the data, appears in different finance studies, plays an important role in modelling such data. Estimation of the quantity IV is natural interest in finance studies. In our talk we are interested to find some estimator of volatility, which is a suitable normalized sum of frequently sampled squared data, and its statistical properties

Srilakshminarayana Gali [SDM Institute For Management Development] *On Trimmed Sums and their behaviour*
Abstract : Let $\{X_n, n \geq 1\}$ be a sequence of independent and identically distributed non-negative valued random variables with a continuous distribution function F. Define the trimmed sum ${}^{(r)}S_n$ as the partial sum, excluding r largest observations, where r is a fixed integer. In this talk we discuss about the behaviour of the trimmed sums with respect to distributional convergence as well as almost sure convergence.

Sreekar Vadlamani [TIFR-CAM, Bangalore]

Title : *Characterization of valuations in finite and infinite dimensions.*
Abstract : I'll present a brief overview of Hadwiger's characterization theorem and it's new proof given by Daniel Klain. Then I'll mention fairly recent results by Alesker in the same direction and connect them to Gaussian Minkowski functionals,,,, which have a natural infinite dimensional analog. This poses some new and interesting characterization questions related to convex bodies.

ABSTRACTS FOR SHORT PRESENTATIONS - 10TH DEC

Rajesh Sundaresan [IISc, Bangalore]

Title : Broadcasting in a random network
Abstract : On an Erdos-Renyi graph $G(n, p_n)$, let T_n denote the maximum number of disjoint spanning trees. It is known that so long as $p_n = \sqrt{r_n(\log n)/n}$, where r_n is some sequence that increases to infinity, $T_n/(np_n)$ converges to $1/2$ almost surely. Moreover, there is a decentralised algorithm that finds nearly all spanning trees.

We pose the following questions. How small can p_n be so that the result continues to hold? Is there a decentralised algorithm to find nearly all of these trees?

Rahul Roy [ISI, Delhi]

Title : *A probabilistic proof of the Euler's formula*
Abstract : We show that $\zeta(2) = \sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6}$.