## POSTER PRESENTATIONS

15/DECEMBER/2017 (12:35 – 13:10)

**Partha Pratim Ghosh:** (ISI, Delhi) *Criticality and covered area fraction in confetti percolation*
Using the randomized algorithm method developed by Duminil-Copin, Raoufi, Tassion (2016, 2017) we exhibit sharp phase transition for the confetti percolation model. This provides an alternate proof that the critical parameter for percolation in this model is 1/2 when the underlying shapes for the distinct colours arise from the same distribution. This extends the work of Hirsch (2015) and Mller (2016). In addition we study the covered area fraction for this model, which is akin to the covered volume fraction in continuum percolation. This study allows us to calculate exact critical parameter for percolation when the underlying shapes for different colours may be of different sizes subject to a certain transitivity condition.

**Somnath Pradhan:** (IISc, Bangalore) *Zero-Sum Risk-Sensitive Stochastic Differential Games with Reflecting Diffusions on Orthant*
We study zero-sum risk-sensitive stochastic differential games on the infinite horizon where the state is a controlled reflecting diffusion in the nonnegative orthant. We consider two payoff evolution criteria: discounted payoff and ergodic payoff. Under certain assumptions we establish the existence of saddle point equilibria. We obtain our results by studying the corresponding Hamilton - Jacobi - Isaacs equations.

**Anand Deo:** (TIFR, Mumbai) *Credit Risk - Simple Closed Form Approximate Maximum Likelihood Estimator*
We consider discrete default intensity based and logit type reduced form models for conditional default probabilities for corporate loans where we develop simple closed form approximations to the maximum likelihood estimator (MLE) when the underlying covariates follow a stationary Gaussian process. In a practically reasonable asymptotic regime where the default probabilities are small, say 1 3

**Karthik P. N.:** (IISc, Bangalore) *Equivalence of Projections in Relative $\alpha$-entropy and Rényi Divergence*
The aim of this work is to establish that two recently published projection theorems, one dealing with a parametric generalization of relative entropy and another dealing with Rnyi divergence, are equivalent under a correspondence on the space of probability measures. Further, we demonstrate that the associated Pythagorean theorems are equivalent under this correspondence. Finally, we apply Eguchis method of obtaining Riemannian metrics from general divergence functions to show that the geometry arising from the above divergences are equivalent under the aforementioned correspondence.

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**Sukrit Chakraborty:** (ISI, Kolkata) *Boolean convolutions and regular variations*
In non-commutative probability theory three main (universal) notions of independence arise- classical, free and boolean and hence they give rise to corresponding additive and multiplicative convolutions. It is very interesting to see what happens to the convolution (additive and multiplicative) of probability measures which have regularly varying tail indices. It is known in the additive case that the regularly varying distributions are classical and free subexponential. Breiman's theorem governs the behavior of the classical multiplicative convolution. Here we show that regularly varying distributions are Boolean-subexponential with respect to additive Boolean convolution and satisfy an analogous statement of the Breiman's theorem in case of multiplicative Boolean convolution. We shall also see some applications of the the above results

for the Belinschi-Nica map associated to free infinitely divisible subordinators, Complex Burgers equation, free Brownian motion and Boolean extreme value theory. This is a joint work with Rajat Subhra Hazra (ISI, Kolkata).

**Sarath Ampadi Yasodharan:** (IISc, Bangalore) *Large deviations for the invariant measure of a mean-field model with jumps*

We consider a long-range mean-field interacting particle system over a countable state space, where the state of each particle evolves depending on the empirical measure of states of all the particles. Such a model is applicable for many engineered systems, such as a system of interacting queues in a cloud computing setting, and a system of interacting nodes in a wireless LAN setting. In the limit of large number of particles, when the initial sequence of empirical measures converges weakly to a deterministic measure $\nu$, it is well known that the evolution of the empirical measure process converges to the solution of the McKean-Vlasov dynamics starting at $\nu$. Under the stationary regime, when the McKean-Vlasov dynamics has a unique globally asymptotically stable equilibrium $\xi^*$, one can also establish that the invariant measure associated with the $N$ particle system converges weakly to the point mass at $\xi^*$. As a first step towards understanding metastability in such systems, we study the question of large deviations for the sequence of invariant measures of the empirical measure process. Under suitable assumptions, we show that the sequence of invariant measures satisfies the large deviation principle with a good rate function.

**Biltu Dan:** (ISI, Kolkata) *Scaling limit of the discrete membrane model in any dimension*

The discrete membrane model turns out to be an important random interface model. Unlike the more famous discrete Gaussian free field the membrane model lacks of random walk representation for the covariance structure and FKG properties. We show that the field, as the lattice is rescaled, converges in distribution to its continuum counter part. In case of dimension d¿4 the convergence occurs in the space of tempered distributions and in other cases we have convergence in some suitable Sobolev spaces. Also we show that in dimension d=2,3, the interpolated field converges in distribution in the space of all continuous functions on some domain. (This is based on an ongoing joint work with Alessandra Cipriani (University of Bath) and Rajat Subhra Hazra (ISI Kolkata)).

**Vinay Kumar Bindiganavile Ramadas:** (IISc, Bangalore), *Independent percolations on a finite graph*

Percolation on a finite graph $G = (V, E)$ refers to the presence of a large component. In our scenario, a component is "large" if it includes a $1-\delta$ fraction of the number of vertices in the graph, where$\delta > 0$ is a small quantity. Let $s$ be a fixed source node. Consider $n$ independent realizations of the site percolation process on $G$ with probability $p$. Let $T_i$ denote the component containing $s$ in the $i$th realization and $\overline{T_i}$ be the closure of $T_i$ i.e. $T_i$ along with its set of neighbours. Further, let $R$ be the set of nodes which are present in at least $k$ of the $n$ $\overline{T_i}$s. Our goal is to find the minimum probability $p$ such that the expected size of the component $R$ is large, and for this minimum value of $p$, to determine the value of $T = \sum_{i=1}^{n} |T_i|$. In a networking scenario, this corresponds to the total number of transmissions in the network to ensure that a $1-\delta$ fraction of the nodes receive atleast $k$ out of $n$ messages that are transmitted by the source using a probabilistic forwarding algorithm. We present some simulation results and heuristics on random geometric graphs and grids and analyze the above scenario on trees.