ICTS Seminar (Bangalore Probability Seminar)

Title : Bond percolation games on rooted regular trees and ergodicity of related stochastic tree automata

Speaker : Moumanti Podder (IISER Pune)

Date : Monday 20th March, 2023

Time : 11:00 am to 12:00 pm (IST)

Abstract : Let T_d denote the tree rooted at ϕ such that each vertex of T_d has precisely d children. Given $p \in (0, 1)$, let us assign, to each edge of T_d, a label that reads trap with probability p and safe with probability $1 - p$. In a bond percolation game played on T_d, two players take turns to make moves, starting at the root, where a move involves relocating a token from its current position, say a vertex u of T_d, to one of the children of u. A player wins if she is able to force her opponent to move the token along an edge marked a trap. We show that this game has probability 0 of resulting in a draw if and only if a related probabilistic tree automaton B_p is ergodic. We then show that B_p is non-ergodic for all $p < pc$ and ergodic for all $p \geqslant pc$, where

$$p_c = 1 - \frac{(d+1)^{d-1}}{d^d}.$$

Much of the proof involves a technique employed in showing that a given model of statistical mechanics defined on T_d has a unique Gibbs measure (i.e. exhibits weak spatial mixing): establishing that no matter what boundary configuration η of states (from the alphabet associated with B_p) we assign to the vertices at generation n of T_d, the effect of η, via the application of B_p, on the state of the root ϕ dwindles or decays as $n \to \infty$. 1

Venue : Hybrid Mode

Emmy Noether Seminar Room and Online

Please click the below link to join the seminar.

https://icts-res-in.zoom.us/j/81366105986?pwd=Y20vNWxLemd4cVdJd1g5NHFrNWg0Zz09
Meeting ID: 813 6610 5986
Passcode: 202023