ICTS Seminar

Title : A Tale of Two-timescale Stochastic Approximation and Random Topology

Speaker : Gugan Thoppe, Duke University, U.S

Date : Monday, 18 March, 2019

Time : 11:30 AM

Venue : Emmy Noether Seminar Room, ICTS Campus, Bangalore

Abstract : The first part of the talk concerns Stochastic Approximation (SA)which refers to any algorithm that resembles a noisy Euler method.Specifically, we shall discuss two-timescale SA which mimic methods with nested for-loops. Using a neat induction trick, our key result is a tight convergence rate estimate.

The second half of the talk concerns the topology of random simplicial complexes. We shall first derive a CLT for Betti numbers of Costa-Farber complexes. The key step in the proof involves a novel decomposition of Betti numbers in terms of strongly connected subcomplexes. Following this, we shall discuss the connections between Minimal Spanning Acycles (MSAs) and Persistence Diagrams (PDs) in weighted complexes. As an application, we shall see that both, the set of extremal deaths in the PD and the set of extremal weights in the MSA associated with the randomly weighted d−Linial-Meshulam (LM) complex, converge to a Poisson point process.