The Dispersion Time of Random Walks on Finite Graphs

John Sylvester (Talk presenter), Joint work with
Nicolás Rivera, Thomas Sauerwald, Alexandre Stauffer

Consider two random processes on an n vertex graph related to Internal Diffusion-Limited Aggregation (IDLA). In each process n particles perform independent random walks from a fixed origin until they reach an unvisited vertex, at which point they settle. In the first process only one particle moves until settling and then the next starts, in the second process all particles are released together. We study the dispersion time which is the time taken for the longest walk to settle.

We present a coupling which allows us to compare dispersion time across the two processes and show which is "faster". We prove bounds on the dispersion time(s) in terms of more well studied parameters of random walks such as hitting times and the mixing time. In addition we discuss how to determine the order of the dispersion time for many well known graphs such as expanders, complete binary trees, tori etc.