Google Matrix, fundamentals, applications and beyond

IHES, 15-18 October 2018

Abstracts of the video talks

Monday 15 October – 17h00

Ravi KUMAR, Google CA
Random Walks and Graph Properties

Random walks, an inspiration for PageRank, are natural ways to explore a graph. We will study the use of uniform random walks to estimate various properties such as the size of the graph, average degree, number of triangles, etc. Less obvious random walks can also be designed to do other tasks such as uniformly generating a node or counting network motifs. Our perspective is that one has to be careful in using random walks for other applications.

Tuesday 16 October – 17h00

Andrew TOMKINS, Google CA
Inverted steady states and LAMP models

In this talk we'll cover two variants of random walks on networks. In the first variant, the problem is inverted in that the steady state is known, but the underlying markov chain must be learned subject to some conditions. We motivate this problem of "inverting a steady-state," describe it formally, and give an algorithmic solution. Second, we turn to situations in which the markov assumption is too restrictive, as effective models must retain some information about the more distant past. We describe LAMP: linear additive markov processes, which extend markov chains to take into account the entire history of the process, while retaining sparse parameteriztion, and a clean mathematical interpretation. We'll describe LAMP, characterize its properties, show how to learn such models, and present experimental results.