Ranking algorithms on directed random networks

Date Tuesday, October, 7

Time 3 pm

Location 303 Mudd

Abstract:

The probilistic analysis of information ranking algorithms on directed random networks, e.g., Google's PageRank, has recently led to natural approximations based on stochastic fixed-point equations whose explicit solutions can be constructed on weighted branching trees and are such that their tail behavior can be described in great detail. In this talk I will present a model for generating directed random graphs with prescribed degree distributions where we can prove that the rank of a randomly chosen node converges to the solution of the corresponding fixed-point equation as the number of nodes in the graph grows to infinity. The proof of this result is in the spirit of classical random graph coupling techniques, although the directed nature of the graph combined with the presence of weights in the coupled branching tree requires a more careful treatment. The results we present are applicable to a wide class of linear algorithms on directed graphs, and have the potential to be extended to other max-plus recursions and other types of directed random graphs. This is joint work with Ningyuan Chen and Nelly Litvak.