

Graph Sparsification

Debmalya Panigrahi, Duke University

Recently, there has been growing interest in graph sparsification --- replacing dense/large graphs with sparser/smaller graphs while (approximately) preserving the value of certain graph parameters. This includes spanners/emulators (where pair-wise distances between vertices are preserved), vertex sparsifiers (where the connectivity of terminal subsets are preserved), cut sparsifiers (where the weights of all cuts are preserved), spectral sparsifiers (where quadratic forms defined on the graph Laplacian are preserved), etc. I will briefly survey these various graph sparsification paradigms highlighting some of the key results and future challenges in each area. Then, I will focus on cut sparsification and describe a general framework for constructing cut sparsifiers in undirected graphs, and use it to simplify, unify, and improve upon previous combinatorial and algorithmic results in this area.