**Improved Cheeger's Inequality**

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Cheeger's inequality is a classical result in spectral graph theory which states that the second eigenvalue of the normalized Laplacian matrix of a graph is small if and only if the graph has a sparse cut. The proof of this inequality gives a simple near linear time algorithm for approximating the sparsest cut of the graph.

In this talk I discuss families graphs where, for a small number $k>2$, the $k$-th eigenvalue of the normalized Laplacian matrix is large. We show that in these families of graphs the classical spectral partitioning algorithm provides a very good approximation to the sparsest cut. Intuitively, the reason is that these families of graphs are unions of at most $k$ expanding subgraphs.