

1086-AF-1493

Van Emden Henson* (henson5@llnl.gov). *Spectral Methods for Finding Near-Bipartite Components in Large Scale-Free Graphs.*

Spectral transformations can be used to map the vertices in large graphs into low-dimensional spaces where important graph features can often be discovered or approximated with increased efficiency. While many common definitions assume the members of a community are more strongly connected to each other than to nonmembers, realistic communities may contain subsets of vertices with little or no possibility of direct connection; that is, they may contain bipartite or near-bipartite components. For example, a job-placement website may have many connections between applicants and potential employers but few if any connections among the applicants, who are competitors for the jobs, or among the employers, who are competitors for the applicants. Good community detection algorithms should not fail in these circumstances, which are commonly present in real-world networks.

We describe spectral-based methods for looking for strong near-bipartite communities. Specifically, we examine the spectra of common matrices used to represent graphs, particularly the combinatorial, normalized, and signless graph Laplacians. We extend theory relating the eigenpairs to clustering and bipartite components. We describe and demonstrate algorithms that seek to identify near-bipartite components. (Received September 22, 2012)