

Heat Kernel Pagerank as a Linear Solver and Applications to Consensus Problems

Olivia Simpson, University of California, San Diego

We present a new and efficient algorithm for determining a consensus value for a network of agents using heat kernel pagerank. We consider two frameworks for the consensus problem. The first is a weighted average consensus among all agents in which state values can be computed with a single heat kernel pagerank vector. The second is consensus in a leader-following formation in which state values can be computed by solving a linear system with a boundary condition with finitely many samples of heat kernel pagerank vectors. Using an efficient heat kernel pagerank approximation algorithm, we can compute state values for very large networks in sublinear time.