Consensus, communities and centralities for large networks

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Dynamical systems taking place on networks, such as opinion dynamics, synchronisation, consensus or random walks, uncover a lot about the structure of the network. In particular every consensus dynamics provides a centrality measure of the nodes and edges in the graph, and a way to cluster the nodes into communities, i.e. sets of densely connected nodes. This dynamical approach to large networks analysis highlights unexpected links between various notions such as PageRank, MinCut, modularity and spectral clustering. We show applications to social, technological and biological networks.