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Efficiency modularity for finding communities and anti-communities in networks.

The increasing availability of large-scale data sets in the last decade has produced a tremendous amount of interest and progress in the field of network science. A community in a network is a group of nodes more tightly connected to each other than with nodes outside the group. Detecting community structure within networks is important in a variety of real-world settings, including social networks, metabolic networks, computer networks, and more. The modularity quality function commonly employed for finding community structure in complex networks is generalized in this work to a one-parameter family of quality functions. The generalization of network modularity discussed in this talk is based on the concept of graph efficiency, a metric first proposed by Latora and Marchiori. We define the *efficiency modularity* of a partition and demonstrate that it can be used to find either community or anti-community structure within a network. (Received August 28, 2014)