

## Game Theory and Social Networks

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We consider various game-theoretic methods that are used to analyze social networks. Social networks are visualized using social graphs. Graph theory provides main analysis tools for social networks. In particular, by calculating centrality measures for nodes and edges one may detect active participants (members) of a social network. We use for the analysis of social networks game-theoretic approach. We propose a new concept of the betweenness centrality for weighted graphs using the methods of cooperative game theory. The characteristic function is determined by special way for different coalitions (subsets of the graph). The betweenness centrality is determined as the Myerson value. The results of computer simulations for some examples of networks, in particular, for the popular Russian social network “VKontakte”, as well as the comparing with the PageRank method are presented. Then we apply game-theoretic methods for community detection in networks. Finally, for approaches based on potential games we suggest a very efficient computational scheme using Gibbs sampling.