

The Position Value and the Centrality in Social Networks

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ABSTRACT

Centrality is a sociological notion, which is not clearly defined, but that, at its core, measures the extent in which actors in a social network are connected to other actors.

In this work, it is assumed that a social network is given by a graph (N,G) that shows the possible (direct) communications between actors (nodes) in the social network.

A (zero-normalized) coalitional game (N,v) is considered to reflect the interests that motivate the interactions among individuals (players) in the social network.

Given the communication situation (N,v,G) consisting of the coalitional game (N,v) and the graph (N,G) we propose, to measuring the centrality of each actor in the social network, considering the difference between his position value (Borm et al., 1992) in the communication situation (N,v,G) and his position value in the communication situation (N,v,GN) , being GN the complete graph. A parallel development, taking the Myerson value (Myerson, 1977) instead of the position value as allocation rule, appears in Gómez et al. (2003).

References:

Myerson, R. (1977): Graphs and cooperation in games. *Mathematics of Operations Research*, 2: 225-229.

Borm, P., Owen, G., and Tijs, S. (1992). On the position value for communication situations. *SIAM Journal on Discrete Mathematics*, 5: 305-320.

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