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Centrality and polarization on the network analysis of the Chilean Chamber of Deputies

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Introduction

In trying to understand the political structure of parliaments, some works have studied the topology of the underlying network constructed from voting records [1, 2, 3]. Following the same line, in this work we built networks from public records of roll call votes of the Chilean Chamber of Deputies. Specifically, votes of the 2018-2021 legislative term. In order to accomplish this, every Deputy was considered a node and we tried two different approaches on how to link them.

The first approach consisted on simply link each pair of Deputies if they both voted the same option (for, against, or abstain) while storing the number of time this occurred as the link weight (several voting sessions). The second approach consisted on, not only consider when votes of a pair coincided, but instead also take into account when they voted oposite options. This can be addressed by having link weights with negative values, as it was suggested on a previous study [4]. Then we could expect Deputies with different political views have negative or low link weight values, while the ones with common political ideas should have stronger and positive weight values.

Now, as the first approach build a network with non-negative link weight values, we can use centrality metrics, like Betweenness Centrality [5], to find which nodes are relevant or influential, or use community detections algorithms, like the Spin-Glass one [6], to take a look on how much polarized the network is. On the other hand, with the other approach we can't use those metrics and algorithms directly, since they are not well defined for networks with negative link weights and their equivalence are non trivial.

Thus, the aim of this work is to extend some of the analysis for non-negative weighted networks for networks with negative values on its link weights, and compare the results of each approach.

References

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