MATH 191 GRAPHS AND NETWORKS RESEARCH PROJECT

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Abstract. Abstract goes here. Provide 10-15 lines with a summary of your work.

Key words. A few keyword that best describe your work. For example: network centrality, spectral algorithms, gravity models, vertex similarity, core periphery structure, directed graphs, local-to-global algorithms, multiple network alignment, clustering bipartite graphs, angular synchronization

1. Introduction.

This is the Introduction.

This is how you cite a reference paper [1] or multiple ones [1, 2].

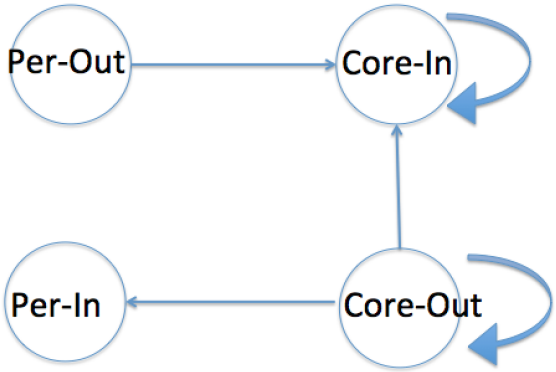

FIG. 1.1. *This is how you add a plot to a Figure. It is always a good idea to add such a caption to each Figure, and explain what the figure is about. Also, if your plot has x and y axis, please always label your graphs (within MATLAB) so that your plots/results can be easily read and understood.*

This is how you cite a (labeled) section: In Section 2, we describe the related work considered in [2]. In Section 3 we ... In Section 4 we test the above algorithms on synthetically generated data sets, while in Section 5 we do so for a real data set. Finally, in Section 6 we conclude with a summary of our results, and discuss future possible research direction.

2. Related work. Questions/Comments/Things that could be done

- What is a good notion of core-periphery structure in directed networks? Would the null model shown in Figure 1.1 be a good model?
- Can one build on or expand some of the above methods and apply them to directed networks?
- As a starting point, perhaps apply simulated annealing to the objective function induced by the above null model
- Apply this to a real network, a good such example might be the migration network between counties in the United States, which we have seen in class in the past.
- This is how you add an url link

  http://people.maths.ox.ac.uk/porterm/papers/prestige_final.pdf

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3. Our work.

Describe the bulk of your work in this section.

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4. Numerical experiments on synthetic data. Present here the numerical results you obtain on a synthetically generated data set...

5. Numerical experiments on real data. Present here the numerical results you obtain on a real data set...

6. Summary and conclusion. Summarize your work in this section.

REFERENCES

[1] M. Cucuringu, M. P. Rombach, S. H. Lee, and M. A. Porter, *Detection of core-periphery structure in networks using spectral methods and geodesic paths*, submitted, arXiv:1410.6572, (2014).

[2] M. P. Rombach, M. A. Porter, J. H. Fowler, and P. J. Mucha, *Core-periphery structure in networks*, SIAM J. Appl. Math., 74 (2014), pp. 167–190.