Numerical Linear Algebra Aspects in the Analysis of Absorption Graphs

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Abstract

Graphs with absorption play an important role in applications such as the modeling of epidemics spreading. Recently, K. A. Jacobsen and J. Tien [1] have discussed properties of the *absorption inverse* L^d of the graph Laplacian L, a particular (1,2)-inverse of L, and have shown how the absorption inverse can provide a wealth of information on the structure of the underlying graph. For example, quantities associated with L^d can be used to define a distance on the graph, and to develop graph partitioning heuristics. Moreover, the row sums of L^d can be used to rank the nodes in a graph with absorption (i.e., they provide a centrality index). In this talk we will discuss some computational aspects of the absorption inverse, including the use of matrix factorization and of iterative methods for computing L^d and quantities associated with it. Furthermore, we examine alternative centrality measures for ranking the nodes of graphs with absorption and compare them to the the one proposed by Jacobsen and Thien.

References

[1] K. Jacobsen, J. Tien, A generalized inverse for graphs with absorption, Linear Algebra and its Applications, 537 (2018), pp. 118–147.