

1154-15-1284

**Thomas R Cameron\*** (thcameron@davidson.edu). *On the Graph Laplacian and the Rankability of Data.*

The concept of dominance relations and its connection to ranking dates back to Dodgson's voting method and Landau's study of animal societies. Recently, Anderson et al. proposed the concept of rankability, which refers to a dataset's inherent ability to be ranked in a meaningful way. In the process, they defined a measure of rankability that is based on the number of edge additions or deletions required to change a given digraph to a complete dominance graph, i.e., an acyclic tournament graph.

In this talk, we present a spectral-degree characterization of complete dominance graphs. Then, we use this characterization to define a new measure of rankability. The effectiveness of this measure is supported by several results for complete dominance graphs regarding the conditioning of their Laplacian spectrum, the effect of a single edge change on their Laplacian spectrum, and a sharp upper bound on the Hausdorff distance between their Laplacian spectrum and that of an arbitrary directed graph with weights between zero and one. Finally, we analyze the rankability of several datasets from the world of chess and college football. (Received September 14, 2019)