1096-H1-2363   **Genevieve Brown*** (`genevievebrown2008@u.northwestern.edu`) and **Sean Lynch**. *A New Basis for Graph Partitioning: Standardizing the Interactions Matrix.*

Several popular graph partitioning algorithms (CNM, Louvain) attempt to optimize a quantity called modularity, however, modularity based algorithms suffer from a "resolution limit" and thus fail to identify small communities within a graph. McCloskey et al. (2010) proposed a correction to this by introducing a standardizing factor into modularity. In addition, they present a graph matrix derived from a linear statistical model called the Interactions matrix as a candidate for spectral partitioning and investigate its theoretical connections to other graph matrices.

Noting the success of standardizing modularity, here we develop a new matrix for spectral graph partitioning by standardizing the Interactions matrix. Following an analogous path to that taken by McCloskey et al. we model the adjacency matrix with a multinomial random variable and make an independence assumption. We use the model to calculate distribution quantities for the Interactions terms and thus obtain the Standardized Interactions matrix. Finally, we manipulate the matrix and obtain an approximate form suitable for large scale implementation. Partitioning results are investigated and presented via examples and comparisons against existing algorithms. (Received September 17, 2013)