Minimizing the Number of Edge Swaps to Obtain a Bipartite Graph

Caroline Leal*, United States Naval Academy
Franklin Kenter, United States Naval Academy

A graph is said to be *bipartite* if the vertices are two-colorable, the graph contains no odd cycles, and the eigenvalues are symmetric. Given two copies of a graph G, we would like to know: "What is the minimum number of corresponding edge swaps that are required to make a graph bipartite?" To approach this problem, we use matrix norms and the eigenvalues of the respective adjacency matrix to set bounds for the minimum number of swaps required for G. Additionally, we have an heuristic algorithm based on matrix norms.

Keywords: bipartite, eigenvalues, edge switching, adjacency matrix, matrix norms