Weekly Report 8

Yiduo Ke

ORIE 4999 Supervised by Professor Williamson

# What I did

I fixed my SDP max cut code; it now does better than expected. Initially, Renee and I thought the problem was in Cholesky decomposition and how I used the upper, lower, and permutation matrices. didn’t return the original matrix. In this screenshot of my terminal, is the optimized positive semidefinite matrix, is the permutation matrix after doing Cholesky decomposition, and are the lower and upper matrices, respectively, after Cholesky decomposition.

Table

Description automatically generated

is indeed symmetric and Hermitian:

Graphical user interface, text, application, email

Description automatically generated

But it’s not positive semidefinite, as some of its eigenvalues are (very slightly) negative:

Text

Description automatically generated

But since the negative eigenvalues are basically , I guess is positive semidefinite. I decided to go back to the paper and realized I was too negligent. Turns out I did unnecessary steps after optimizing ; I didn’t need to Cholesky decompose it. Now I got rid of those steps and the the SDP function performs better than expected. Here is a screenshot of test\_results.txt:

# Text Description automatically generated

# What I will do next week

* Clone everything I have now and convert it to weighted graph version