

Weekly Reports 6 and 7

Yiduo Ke

ORIE 4999 Supervised by Professor Williamson

What I did

- Implemented Trevisan's MAX-CUT approximation algorithm
- Tested Trevisan's MAX-CUT. It works *really* well (see test_results.txt).
- Cleaned up the code by modularizing frequently used expressions and putting them in a separate file

Questions

- When doing two_thresholds_spectral_cut:
 - Sometimes a few elements of the eigenvector corresponding to the smallest eigenvalue of the normalized adjacency matrix could have the same absolute value, but they don't show up exactly (for example, I had an eigenvector that was [0.5, -0.5, 0.5, -0.5] to be exact but Julia gave me something like [0.5000000001, -0.4999999999, 0.50000000002, -0.499999999999997]), this messes up the \vec{y} 's, which messes up the function output. What is the best way to handle this? Do I use \approx somewhere in there?
 - When calculating $\min_{y^k} \frac{\sum_{(i,j)} A_{(i,j)} |y_i^k + y_j^k|}{\sum_i d_i |y_i^k|}$, sometimes the denominator could be 0, causing the fraction to be NaN. Julia still returns an answer, though, so should I ignore this?
- I don't think my SDP implementation is quite right because the test numbers don't look right, but I don't know what I'm doing wrong. Please help!

What I will do next week

- Fixing/improving my SDP implementation?
- Converting my work so far to weighted graphs? Not sure. I would like suggestions!