

Weekly Reports 6 and 7

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## What I did

- Implemented Trevisan's MAX-CUT approximation algorithm (untested, but compiles and runs)
- 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?

## What I will do next week

- Test my implementation of Trevisan's MAX-CUT
- Converting my work so far to weighted graphs? I don't know. I would like suggestions!