Major Changes:

There was a bug in the code.

What I have accomplished so far:

Last, we realized that our code actually worked for the tree-cross-line example on an instance of size $10^9$ and up. I decided to check it out on a specific mesh graph with different weights.

Gary also talked about with diffusion; the cut may not correspond to the second eigenvector exactly. In the Cartesian product of the graph, the eigenvalues of that graph are $\lambda_G \lambda_H$ where $\lambda_G$ is an eigenvalue of first graph and $\lambda_H$ is an eigenvalue of the second graph. Therefore, the second smallest eigenvalue of the Cartesian product is $\min(\lambda_G(2), \lambda_H(2))$ where $\lambda_G(2)$ is the smallest non-zero eigenvalue of the first graph. At times, $\lambda_G(2) < \lambda_H(2)$ but $\lambda_H(2)$ is the eigenvalue/eigenvector we want to use. This serves as the basis of the tree-cross-line counterexample. However, if I’m understanding Gary correctly, he believes that with diffusion, some parts of the ”correct” eigenvector is used and thus we might even get a correct answer.

Meeting my Milestone

Here are the tasks that I set out to do:

- Try bigger/different examples on CRD. Specifically, k-ary trees.
- Find out what to do for meeting of the minds.

I tried it on k-ary trees and weighted mesh graph. I created a multigraph for my weighted mesh graph but for some reason the code is behaving strangely. I would need to go back and use an actual weight graph instead; however, the algorithm is not defined for a weighted graph. The k-ary trees was the same as the normal binary trees.

Since meeting of the minds is not happening, I think I have an idea of what to do for the poster. For now, it looks like we’re going to do examples of the CRD algorithm on different classical counterexamples of random walks and see how it works.

Surprises:

None.

Revisions to Milestones For the next report, I would like to have the following accomplished

- Explore Gary’s thought on diffusion

Gary sent a email yesterday, so for next week at least, I will be thinking about the ideas that he thought of.

Resources Needed

No changes.