Math 443 Project: Listening

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1 Summary

For the listening part of this week's assignment, I listened to Siddharth Kunche's presentation. This was my summary of his paper:

The paper presented was about providing a new lower bound on the dissociation number of arbitrary graphs, which describes the maximum number of vertices that induces a graph with degree at most 1. They prove that the dissociation number of a graph G is greater than than $|G| - \frac{1}{3}(|G| + ||G|| + c)$, where c is the number of cycles length 1 mod 3 (I may have misremembered the specifics of this bound in terms of algebra).

They go about proving this new lower bound by considering a minimal counterexample G and they consider a longest path P. Using various other papers they establish several properties of such a minimal counterexample, including the relative location of a cut vertex v along P to a block on the edge of G. They also show v is also cycle disjoint, so at most 1 of the blocks connected to v has a cycle. Using various inequalities it is possible to show that no matter what the relative arrangment of this cycle to v, the inequality to prove holds or it is possible to derive a smaller counterexample, a contradiction, so the inequality holds.

2 My Presentation

One aspect of the presentation that I would improve for my own is better use of visuals, as I was left rather confused at some points given the lack of diagrams. Especially in the high level overview of where a proof is going, a quick picture giving intuition I think would have been very valuable for my understanding. I did however like the overall structure of his presentation, he made the overall results of the paper quite clear from the beginning which I think is important to keep in the audience's mind.