A Really Catchy Title for My Technical Report

Technical Report

Ann Author and Ben Writing

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Department of Computer Science
Hamilton College
Clinton, New York

Abstract

1 Introduction

Why this is important ...

1.1 Motivation

1.2 Our Results

1.3 Organization

In Section 3 we give..., in Section 4...

2 Related Work

Akiba and Iwata [?]...

3 Preliminaries

3.1 Something Central to Understanding Your Result

3.2 Should Probably Have Another Subsection Too

3.2.1 Even More Details on a Specific Method

4 Specific Contribution 1

In this section, we ...
Reduction: If graph $G = (V, E)$ contains a vertex v such that the neighborhood of v, denoted $N(v)$, forms a clique, then the closed neighborhood of v, $N[v]$, can be removed from G as a clique to form reduced graph G'.

Proposition: The reduction is safe.

Proof. Let $C = \{c_1, c_2, \dots, c_k\}$ be a given optimal vertex cover for G, where k is the minimum possible size of C. Let $c_v \in C$ denote a clique such that $v \in c_v$. Observe that since we are given that $N(v)$ is a clique, by the definition of a clique $N[v]$ is also a clique. Let $N[v]$ be denoted by X. If $X \in C$, then X is in an optimal vertex cover, as desired, and can be removed from G. If $X \notin C$, then we argue that we can swap X with c_v and maintain an optimal clique covering of G.
Observe that by the definition of a clique, c_v consits only of v and verticies $u \in N(v)$. Therefore, $c_v \subset X$. Hence, all verticies in c_v are covered by X. Let $C' = (C \setminus c_v) \cup X$ and notice that the single removal of c_v and single addition of clique X maintains the optimal size of C, k. Thus, we have an optimal vertex cover C' such that $X \in C'$.
If $X \notin c_v$, then there exists some $u \in N(v)$ such that $u \notin c_v$. Let $c_u \in C$ denote a clique such that $u \in c_u$. Then, by the defintion of a clique, $c'_u = c_y \setminus \{u\}$ is also a clique. Then if we swap c_u with c'_u, then we remove u from an overlapping clique such that all $v \in X$ reside in a single clique. Thus, we can remove X from G. □

5 Specific Contribution 2

In this section, we ...

5.1 A Subsection Title

6 Experimental Results

In this section...

- item 1
- item 2
- item 3

7 Conclusion

7.1 Contributions

7.2 Future Work

Acknowledgments