Research Proposal:
Traffic Grooming Algorithms on Optical Networks

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1 Introduction

From a graph theory viewpoint traffic grooming is a particularly engaging problem, even though it originated in the practical arenas of computer science. It can be expressed succintly as the following decision problem. Given a graph, $G = (V, E)$, and a set of vertex pairs, and a number of colors, we would like to embed a system of colored paths in the graph. For each vertex pair in the set, we need to create some path linking those two vertices in some particular color. However, any two paths in the embedding that share an edge must use different colors. This problem has many different flavors and variations, some of which are intractable for certain types of graphs.

2 Proposed Research

I will be doing research with my advisor over this summer along with a few other students on exactly this kind of problem. The results we are able to obtain will strongly shape the direction of my thesis. I will have gained valuable experience with working in this field, and will be able to more knowledgably choose specific topics to focus thesis research on. I will begin by reading a great deal of the published research in this area, in particular [1].

3 Prior Research

Although I have not had a lot of experience in this area, I hope to learn a lot from my research this summer. Additionally I have taken Math 168 (Algorithms) and CS 141 (Advanced Topics in Algorithms) here at Harvey Mudd.

References

[1] R. Dutta, S. Huang, G. N. Rouskas, *Traffic Grooming in Path, Star, and Tree Networks: Complexity, Bounds, and Algorithms*, Proceedings of ACM SIGMETRICS 2003, pp. 298-299, July 2003.