## SUBMODULAR FUNCTIONS AND PERFECT GRAPHS

## IN COLLABORATION WITH TARA ABRISHAMI, CEMIL DIBEK AND KRISTINA VUŠKOVIĆ,

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ABSTRACT. Perfect graphs are a class of graphs that behave particularly well with respect to coloring. In the 1960's Claude Berge made two conjectures about this class of graphs, that motivated a great deal of research, and by now they have both been solved. A stable set in a graph is a set of pairwise non-adjacent vertices. Using techniques from combinatorial optimization one can also find the maximum weight stable set in a perfect graph in polynomial time. However, no algorithm is known to solve this problem that can be stated purely in the language of graph theory (a "combinatorial algorithm"). This is somewhat surprising, given how much is known about the structure of perfect graphs.

Recently we were able to solve the problem of finding a maximum weight stable set in a subclass of perfect graphs. We were able to harness our structural understanding of the graphs in the class to establish a connection to the well-known submodular function minimization problem, and use the fact that a combinatorial algorithm is known for the latter. In this talk we will discuss the ideas behind our solution.

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