Polyhedral Computations
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Approximating symmetric polyhedra using semidefinite programming

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Abstract

Many computationally hard problems in combinatorial optimization can be fruitfully studied using polyhedral methods. For example finding the stability number of a graph can be formulated as a linear optimization problem over the stable set polytope. Although this does not give an efficient algorithm it opens the possibility to find easy to compute relaxations of the stable set polytope and so to find upper bound on the stability number.

In this talk I will show how one can use a hierarchy of semidefinite programming relaxations to find upper bounds on the stability number of a graph. I will especially focus on symmetric graphs and explain how one can use representation theory of groups to simplify the semidefinite programs under consideration. In this way I will review on the paper "New code upper bounds from the Terwilliger algebra and semidefinite programming" of A. Schrijver. If time permits I will apply this method to give new upper bounds for kissing numbers.