

Exercise 1. Consider the semidefinite program corresponding to a relaxation of MAX-CUT as seen in the class. Show that the optimal value of this program is at least $T/2$, where T is the sum of the weights of the edges.

Exercise 2. Consider the problem MAX-CUT with the additional constraint that some specified pair of vertices are on the same/opposite side of the cut. Give a strict quadratic program and vector program relaxation for this problem. Show how the approximation algorithm seen in class can be adapted to this problem. What is its approximation factor ?

Exercise 3. Give a quadratic program for MAX-2SAT. Using an extra variable, make this program strict (that is transform it so that there are no terms of degree 1) and relax it to a vector program.