CS 1511 Homework 24

Mathew Varughese, Justin Kramer, Zach Smith

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48. Problem 11.2

If there is a verifier that can do this, then there is a verifier that can try every possible query.

49. Problem 11.7 Consider the following problem: Given a system of linear equations in n with coeffi- cients that are rational numbers, determine the largest subset of equations that are simultaneously satisfiable. Show that there is a constant ¡ 1 such that approximat- ing the size of this subset is NP-hard.

50. Problem 11.16

We can run Gaussian Elimination on the matrix formed by the equations. This operation is n^3. Now, taking this system, we create a system of equations that are similar to those in the MAXSAT problem. To rid of the rational coefficients, we can simply multiply by a common factor of all coefficients to make them whole numbers. We take the mod 2 of each coefficient. Then, since the equations are linear, we have a system very similar to MAXSAT. If the equations are not satisfiable in this, they will not be satisfiable be the linear equations. To find this p, we perform a gap reduction just as we did in the MAXSAT problem.