ABSTRACT

This dissertation addresses one of the combinatorial optimization problems: the Maximum Satisfiability (MaxSat). Given a set C of disjunctive clauses defined on a set X of Boolean variables, the problem consists in determining a logical assignment to the X's variables that satisfies the maximum number of C's clauses.

MaxSat belongs to the NP-Complete class so no polynomial algorithm was defined to solve it. Since it arises in many practical contexts researchers scarified optimality and started looking for good approximate solution in reasonable amount of time .

Taboo search(TS) is one of the methods designed to solve the combinatorial optimization problems. Developed independently by Glover and Hansen, TS is a "universal" strategy which means that it was not designed for a specific problem. It originated as a method for solving real world optimization problems in scheduling and covering and more recently, has proved its performance in treating classical problems like the traveling salesman and the graph coloring.

The contribution of this dissertation is the development of taboo search heuristics for MaxSat problem. We developed three algorithms based mainly on TS scheme. The first one is a simple algorithm that uses the basic elements of TS. The second one is a hybrid of the first algorithm with a strategy used in one of the best algorithm in the literature: Gsat with walk. In the third algorithm, we take advantage of TS's intensification idea resulted to a two phase intensified algorithm. These algorithms are experimented through extensive computational tests to study the factors that influence their performance and their robustness. Gsat With Walk is taken as an algorithm for comparison in order to make the solutions' quality more significant.