**Introduction**

The subset sum problem is an important problem in complexity theory and cryptography. The subset problem is one of the most fundamental NP-complete problems. Given integers and . The decision version of subset sum problem asks whether there exists a subset of such that ; i.e., whether there exists a subsequence of with sum . The maximization version of subset sum problem is to find a subset such that the corresponding total of the elements in the subset is maximized without exceeding the capacity c. The Subset sum problem is often thought of as a special case of the Knapsack problem, where the weight of a data item is proportional to its size.

The subset sum problem has many applications, for example, a decision version of SSP with unique solutions represents a secret message in a SSP-based cryptosystem. It also appears in more complicated combinatorial problem, scheduling problems, 0-1 integer programs and bin packing algorithms. This problem arises in practical applications. Similar to the knapsack problem we may have a truck that can carry at most *t* pounds and we have *n* different boxes to ship and the *i*th box weighs pounds. The problem arises in situations where a quantitative target should be reached, such that its negative deviation (of loss of, e.g., trim, space, time, money) must be minimized and a positive deviation is not allowed.

References

1. AndrisAmbainis, Quantum walk algorithm for element distinctness, SIAM Journal on Computing 37 (2007), 210–239