

Abstract

Nowadays, Industries face extreme competitive conditions in costs, quality, sales and services. Moreover, manufacturing technology has been more complicated. Thus, the manufacturing process become larger and more complex. As above mention, the problem solving methods should be proper and these include the simplex methods and the meta heuristics of Bees and Harmony Search algorithms. The simplex method is a local descent algorithm which is based on the geometrical figure. The operations of this method are to drive itself to improve and escape itself from the worse. However, there are more operations to be considered. These four basic procedures are reflection, expansion, contraction and shrinkage or massive contraction. Bees and Harmony Search algorithms are the newest meta heuristics for solving engineering problems.

This study presents solution procedures of the modified simplex, super modified simplex, weighted centriod simplex and complex simplex methods for solving unconstrained problems with different natures of single and multi peak surfaces including a curved ridge surface. The better algorithm is also applied as the variable neighborhood search method in terms of a hybrid algorithm with Bees and Logarithm Harmony Search Algorithms to solve the constrained problems. From the experimental results of unconstrained problem the modified simplex method provided the better solution on both the mean and standard deviation of design points and yields when compared. It has been then developed on Bees and Logarithm Harmony Search algorithms. From the results on constrained problems, the hybrid on Logarithm Harmony Search algorithm seems to be better on both the mean and standard deviation of yields.