

MODIFIED TABU SEARCH TO SOLVE COMPLEX, CONTINUOUS-VARIABLE
PROBLEMS THROUGH GRADIENT ANALYSIS AND CONTOUR JUMPS

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ABSTRACT

This paper introduces a method of solving np-hard problems with continuous random variables by using a modified Tabu search algorithm. Traditionally, Tabu search is a metaheuristic that deals with binary or integer variable type problems and finds “good” solutions to the problem.

This study explores the Tabu search algorithm and presents a methodology by which the algorithm can be modified to handle continuous random variables as well as integer and binary. The modifications include an appropriate method of defining the neighborhood solution sets and then an effective manner of moving through the neighborhood to converge to an acceptable solution as quickly as possible.

In addition to moving through the neighborhood, a method of locating and moving to local optima is included. From there this technique will incorporate a method of “jumping” to the base of a new, improving local optima in the state space. From there the algorithm will return to locating and reaching the local optima point.

In this fashion, the modified Tabu search will explore the state space for continually improving points and will “jump over” areas that, while feasible, are not worth exploring. This method saves computation time as well as achieving a more direct route to an acceptably good solution.

In addition, it is proposed that with enough time, the optimal point will be found.