

Multi objective metaheuristics for combinatorial optimization : a review

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Abstract

Research activities within the area of Multiple Objective Optimization traditionally concentrated on Multiple Objective Linear Programming.

In recent years, the demand for new applications resulted in growing interest in multiple objective combinatorial optimization (MOCO) problems.

Following the success of metaheuristics in single objective, many researchers proposed the use of metaheuristics in MOCO. In this review, we focus on multiple objective metaheuristics (MOMH) i.e. algorithms which goal is to generate a set of approximately Pareto-optimal solutions in a single run. This set should be a good approximation of the whole or a part of the nondominated set.

We first describe the main ideas of MOMH: the dominance-based evaluation and the scalarizing functions-based evaluation mechanisms are described, and their advantages and drawbacks are underlined.

The difficult question of evaluation of results of MOMH is analyzed and the different quality measures used in the literature are presented.

The more representative methods are then briefly described, successively using Simulated Annealing, Tabu Search, Genetic algorithm or hybrid evolutionary algorithms.