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**Comparison of genetic algorithms, random restart and two-opt switching for solving large location-allocation problems.** (English) Zbl 0847.90091

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**Summary:** This paper examines the application of a genetic algorithm used in conjunction with a local improvement procedure for solving the location-allocation problem, a traditional multifacility location problem. This problem is difficult to solve using traditional optimization techniques because of its multimodal, nonconvex nature. The alternate location-allocation (ALA) method has been shown to be an effective local improvement procedure for the location-allocation problem. Using the ALA method, an empirical analysis was done to determine the number and size of the local minima of the location-allocation problem to demonstrate the reduction of the size of the search space that can be achieved through the use of the ALA method as an evaluator. A genetic algorithm that evaluates a series of ALA solutions was developed and compared to two traditional heuristic procedures for the problem: random restart and H4, a two-opt procedure. Like the genetic algorithm, both procedures evaluate a series of ALA solutions. A statistical analysis of the quality of the solutions provided by the three procedures for several problems of varying size demonstrated that the genetic algorithm provides the best solutions. An examination of the number of ALA evaluations performed by each procedure showed that the genetic algorithm also found solutions to the larger size problems much quicker than either the random restart or the H4 procedures.

**MSC:**

[90B85](#) Continuous location  
[68T05](#) Learning and adaptive systems in artificial intelligence  
[90C06](#) Large-scale problems in mathematical programming

Cited in **23** Documents

**Keywords:**

[location-allocation](#); [multifacility location](#); [ALA method](#); [genetic algorithm](#); [heuristic](#)

**Software:**

[Genocop](#)

**Full Text:** [DOI](#)

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