

Heuristic Algorithms Development for Layout Planning of Unequal-Sized Facilities with Input/Output Points

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Abstract

Facility layout problem (FLP) is defined as to find layout which minimizes a material handling cost between facilities, given a set of facilities and material flow quantities between them. In this paper, the material handling cost is the sum of the material flow multiplied by rectangular distances between input and output points. A facility is represented as a fixed shapes rectangular block that has input/output points. Facilities can be placed in one of four possible orientations in a free-space horizontally or vertically. According to a given sequence, facilities are placed in a free-space. To determine each facility's position, median method and center of gravity are used. Based on these two methods, improvement steps in respect of a computation time and objective value are conducted. Each improvement is called quick search and candidate selection, respectively. A total of eight methods are implemented and seven problems in the previous literature are adopted to test proposed methods. For three of seven problems the best known objective values were updated by the proposed methods. Comparison results between eight proposed methods show quick search method is faster 21.6% and 26.9% and candidate selection improves objective value by 1.45% and 1.47% at median method and center of gravity, respectively. It shows the improvement methods were effective to achieve each purpose.

Keywords

Facility layout problem, Heuristic algorithm, Quick search, Candidate selection

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Biography

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