SOLVING OF MINIMAX WEBER PROBLEM IN A PLANE WITH FORBIDDEN GAPS[1]

G.G. Zabudsky, N.S. Veremchuk

Omsk Branch of Sobolev Institute of Mathematics SB RAS, Omsk
zabudsky@ofim.oscsbras.ru, n-veremchuk@rambler.ru

Minimax Weber problem is defined as follows. The problem is to locate n new facilities $X_1, ..., X_n$ in the plane when there are m facilities $P_1, ..., P_m$ already located. There are the forbidden rectangular gaps F_k, which sides are parallel to axes of coordinates, $F = \bigcup F_k$, $k = 1, ..., z$; $w_{ij} \geq 0$ and $v_{jk} \geq 0$ — costs of communications between P_i and X_j, X_j and X_k respectively. We need to locate facilities $X_1, ..., X_n$ out of the forbidden gaps so as to minimize the most weighed distance between all facilities [1, 2]. The mathematical model is:

$$\max\{\max_{1\leq i\leq m, 1\leq j\leq n} w_{ij}d(P_i, X_j), \max_{1\leq j<k\leq n} v_{jk}d(X_j, X_k)\} \to \min, \quad (1)$$

$$X_j \notin Int\ F,\ j = 1, ..., n, \quad (2)$$

where $d(\cdot, \cdot)$ — some metric, $Int\ F$ — interior of F.

Results of researches of the problem without restrictions (2) for the rectangular metric are given in [3]. In [1] models of integer linear programming for minimax and minisum Weber problem with the forbidden gaps are constructed. A variant of algorithm of branch and bounds is proposed in work [2].

In the report problem (1)–(2) with rectangular metric is considered. It is proved that for search of the optimum sufficient to consider a subset of admissible solutions. Some variants of the bottom estimates of criterion function are proposed. A modification of the algorithm [2] is developed. Results of the computing experiment in comparison of efficiency of the algorithm and the solving of the problem by means of integer linear programming model and package IBM ILOG CPLEX is represented.

REFERENCES

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