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Network facility location problem with flow capacity of edges.
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In the article under review, a new network facility location problem is presented. Given a graph $G = (V, E)$ with a set of vertices V (facilities and clients) and a set of edges E, an edge $e = (i, j)$ of G denotes the fact that there is a shipping route between vertices i and j. With each vertex i, a demand of clients b_i and a fixed cost of opening a facility are associated. Each edge e has a flow capacity and a unit flow cost. The optimization problem is to choose a subset $W \subseteq V$ at which facilities are to be open and then to assign the clients to these facilities so as to minimize the total cost of opening facilities and serving clients. The well-known capacitated facility location problem of *R. Sridharan* [Eur. J. Oper. Res. 87, No. 2, 203-213 (1995; Zbl 0914.90180)] can be easily reduced to this problem. It is shown that if G is a tree then the problem can be solved by the dynamic programming with the running time $O(|V|^3b^2)$ and the storage $O(|V|^2b)$, where $b = \max(b_i, i \in V)$. If G is a chain then the problem is polynomially solvable with the running time $O(|V|^3)$ and the storage $O(|V|)$. The branch and bound algorithm is developed for the general case. In order to obtain a lower bound for the objective function, a minimum cost flow algorithm of *J. B. Orlin* [Oper. Res. 41, No. 2, 338-350 (1993; Zbl 0781.90036)] is exploited. *Yu.Kochetov (Novosibirsk)*

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