

A STUDY ON THE IMPACT OF BALANCING THE NUMBER OF ELEMENTS OF THE CLUSTERS ON THE UNCAPACITED P-MEDIANS LOCATION PROBLEM USING GRASP WITH PATH-RELINKING

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Abstract: Facilities installation have been a subject of interest in the production engineering, business management, communities of operational research, transport engineering and logistics companies. The studies of facility location problems deal with questions of minimization of costs in the logistics chain. In many situations, these problems are subject to limitations in the capacity of the facility. Due to these restrictions, logistics demands must be satisfied in order to comply with certain financial interests and meet the service level agreements. In this context, this work aims to evaluate the doubly reactive GRASP procedure integrated with the path-relinking technique, designed to solve the generalized uncapacitated p-medians location problem, using the balanced-sized clusters creation approach, in order to verify the impact of this balance in the context of the total cost of transportation service. The p-median problem refers to locate simultaneously the facilities at different areas, in order to minimize the total transportation distance (and therefore the cost), among each distribution center and the facilities allocated in a certain cluster, for satisfying the demands of its customers. Two reaction parameters are used to control the search for solutions in the GRASP construction phase. The simultaneous use of the two reactive parameters allows the creation of a discipline for the allocation of the customers to the clusters: in general, the nearest customers are allocated first. It was also investigated a relation between the size of the clusters and the median vocation index – an index that establishes how close each province is to each other provinces – of each median, which are the centers of distribution of each cluster. Besides that, it is verified that the clusters that contains medians with better median vocation index tends to have more provinces assigned to it. For the evaluation of the algorithm and the effectiveness of the balancing of the clusters and the median vocation index, the data concerning the distances among all the provinces of Spain were used.