

On solving a Huff-type facility location and design problem

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A chain wants to locate a new facility in a market where there already exist m facilities providing the same service. k of those facilities belong to the chain, and the rest to competitors. The location and design problem for the new member of the chain is considered [1].

This talk will deal with the impact of different changes in the Huff-type competitive model in both the profit and the set of optimal locations. The studies are made on a real data set from the Autonomous Region of Murcia, a region in the South-East of Spain. The changes to be studied are:

- Agglomeration of "closely sited" demand points.
- Changes in the flatness of the objective function depending of the number of facilities belonging to the chain.
- Variations in the quality of the existing facilities.
- Changes in the function which translates the market share into expected sales: comparison of a linear versus a convex smooth function.
- Changes in the function giving the operational costs of the facility: how much does it affect to the quality and the location.
- Impact of the budget: solving the Huff-type model for different values of a fixed investment budget.

To solve the problems, we use an interval branch-and-bound algorithm. Changes in profit are evaluated by comparing the (interval) values of the profit function at the different sets of optimal locations; and changes in location are evaluated by comparing the sets of optimal locations with the help a new measuring function.

References

- [1] José Fernández, Blas Pelegrín, Frank Plastria, Boglárka Tóth. *Solving a Huff-like competitive location and design model for profit maximization in the plane*. Submitted to European Journal of Operation Research.