LOCATION AND DESIGN OF A COMPETITIVE FACILITY FOR PROFIT MAXIMISATION

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RESUMEN

A single facility has to be located in competition with fixed existing facilities of similar type. Demand is supposed to be concentrated at a finite number of points, and consumers patronise the facility to which they are attracted most. Attraction is expressed by some function of the quality of the facility and its distance to demand. For existing facilities quality is fixed, while quality of the new facility may be freely chosen at known costs. The total demand captured by the new facility generates income. The question is to find that location and quality for the new facility which maximises the resulting profits.

It is shown that this problem is well posed as soon as consumers are novelty oriented, i.e. attraction ties are resolved in favor of the new facility. Solution of the problem then may be reduced to a bicriterion maxcovering-minquantile problem for which solution methods are known. In the planar case with Euclidean distances and a variety of attraction functions this leads to a finite algorithm polynomial in the number of consumers, whereas, for more general instances, the search of a maximal profit solution is reduced to solving a series of small-scale nonlinear optimisation problems. Alternative tie-resolution rules are finally shown to result in ill-posed problems.

Palabras y frases clave: Competitive location, Consumer behaviour, Facility design, Maxcovering, Minquantile, Biobjective.

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