Competitive location models

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Spatial competition models deal with the choice of locations from which firms sell goods or provide services. A single firm may operate several facilities in a geographical market and their locations affect not only its market share but also the market share of the other competing firms. Any profit oriented company has to face some location decision problems, whether the firm enters a new market or it is an expanding firm already operating in the market. For that reason, research on that topic is flourishing, both with new models to describe such problems and with new methods which are able to solve them.

Localization of competitive facilities is a real-life problem. Thus, it is necessary to describe it as close to reality as possible. The designed models usually either to maximize profit/income or to minimize costs, and the objective functions are normally rather complex. When no other competitor exists, the locating firm will have the monopoly of the market in that area. In such a case, the profit the firm obtains is affected by its decision on location. However, if in the area there already exist other firms offering the same goods, then the location firm will have to compete for the market. Then the profit the firm obtains is also affected by its competitors decisions. Therefore, finding the best location in the presence of competitors is a problem much more difficult to solve than in a monopolistic scenario.

The competition may be *static*, which means that the competitors are already in the market and the owner of the new facility knows their characteristics, or *with foresight*, in which the competitors are not in the market yet, but they will be soon after the new facilities enters. In this case, it is necessary to make decisions with foresight about this competition, leading to Stackelberg-type models. Furthermore, if the competitors can change their decisions, then we have a *dynamic model*, in which the existence of *equilibrium* situations is of major concern.

Many competitive location models are available in literature, see for instance, the survey papers [1–3] and the references therein. Apart from the

taxonomy described for any location problem, competitive location problems have other more specific ingredients, which differentiate the existing models.

In this talk, an introduction to competitive location models will be given, discussing all the important ingredients and the different type of problems mentioned before. If time allows, a special care for costumer behaviour will be taken, which is an important role in competitive location.

References

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[3] F. Plastria. Static competitive facility location: An overview of optimisation approaches. *European Journal of Operational Research*, 129:461–470, 2001.