

## Facility Location. From the simple to bi-level models

Facility location constitutes a broad spectrum of mathematical models, methods, and applications in operations research. It is an interesting topic for theoretical studies, experimental research and real-world applications. Examples include storage facilities, warehouses, police and fire stations, base stations for wireless services, and others. Who actually proposed the first mathematical model in this field will probably never be known. It is most common to credit Pierre de Fermat (1601--1665) and Evangelista Torricelli (1608--1647), who studied a basic form of the spacial median problem.

Surely neither this nor any other lecture can cover all aspects related to facility location. In this talk we discuss only the basic discrete models and present some theoretical results. We consider the well-known uncapacitated facility location problem and its generalizations. As a rule, we assume that there is only one decision maker who tries to minimize the total cost or maximize own market share. However, in many cases we deal with some decision makers. They compete at the market by opening own facilities. These confrontations can be described by the games. In this lecture we present Stackelberg facility location games. We introduce bi-level mixed integer models, explain computational complexity results and some local search methods.