Optimal transport mass theory and bilevel optimization models

Lina Mallozzi
Department of Mathematics and Applications "R. Caccioppoli"
University of Naples "Federico II" - mallozzi@unina.it

Abstract. Optimal transport theory is widely used to solve problems in mathematics and different areas of the sciences. We present and discuss two-stage optimization models corresponding to economic equilibrium problems. A distribution of citizens in an urban area, where a given number of services must be located, is given. Citizens are partitioned in service regions such that each facility serves the costumer demand in one of the service regions. At first, it is assumed that the demand is totally satisfied and in the spirit of a market survey, a social planner divides the market region into a set of service regions in order to minimize the total cost: the objective is to find the optimal location of the services in the urban area and the related costumers partition. Existence results are obtained by using optimal transport mass tools. Similar models where a given number of dimensional facilities must be located are also considered.