OPTIMIZATION PROBLEMS
IN MASS TRANSPORTATION THEORY

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Abstract: The natural framework for describing mass transportation problems is a metric space endowed with a distance which, inserted into the Monge-Kantorovich cost functional, provides the criterion to be optimized. Letting the distance vary in some suitable admissible class provides an interesting model for the description of an urban transportation network and we consider the related optimization problem which consists in finding the desing of the network which has the best transportation performances. A network is a thin (in this case onedimensional) structure where the transported mass has some kind of advantages to flow. Equivalently, the analysis of the influence of the thin structure (network) can be made through the Monge-Kantorovich PDE, where it can be seen as a form of Dirichlet boundary condition. In the lecture other kinds of optimization problems related to mass transportation can be considered. In particular we will illustrate some models for the optimal design of a city, for the optimal pricing policy on a given transportation network, and for the optimal choice of the Riemannian coefficients of a metric. We also present the case of some mass transportation problems which respectively favour the concentration or diffusion of transport rays.