An Optimal Control Problem for Multiagent Systems with Aggregating Cost

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Abstract

In this talk we introduce and study an optimal control problem for multiagent systems, modeled in the Wasserstein space of probability measure, where the cost function fosters the aggregation of the agents, by mean of a suitable reformulation of the classical notion of "multiplicity" used in branched optimal transport, adapted to a dynamical setting with nonholonomic constraints.

A Lagrangian approach is used to carry the analysis. The main motivation for this study is related to supply chains design.

One of the main difficulty is the intrinsic nonsmoothness of the cost function, together with the rough velocity field followed by the agents.

The proved results encompass existence of minimizing cost network in a wide class of cases, and an analysis of the value function associated to the problem.