

New delopements in the study of control of multi-agent systems

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Recently, there has been an increasing interest from the community in real-life complex system modeling. The most popular example is provided by systems where the number of agents is so large, that only a statistical description (reminiscent to the statistical mechanics description of systems in thermodynamics) turns out to be viable. The usual way to model such kind of systems is to choose a measure space over the underlying Euclidean space as new state space: the measure of a set will give an estimate of the agent present in that set. The peculiarity of such and infinite-dimensional space, and the connection with optimal transport theory, lead to a very rich mathematical structure. In this talk we provide some recent results obtained in optimal control of multi-agent systems, among which we mention an extension of the characterization of the value function for some optimal control problems by means of a suitable infinite-dimensional Hamilton-Jacobi equation. Applications will be presented, together with planned future developments.