Ergodic Mean Field Games with Hörmander diffusions

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Abstract

I will present joint results with Federica Dragoni (Cardiff University, UK) on existence, uniqueness and regularity of solutions for a class of systems of subelliptic or hypoelliptic PDEs arising from ergodic Mean Field Game models with Hörmander diffusions [5]. These results are applied to the feedback synthesis of Mean Field Game solutions and Nash equilibria of a large class of $N$-player differential games. In the first part of the talk I will give a brief introduction to this theory of Mean Field Games. It is a series of models introduced by J.-M. Lasry and P.-L. Lions in mid 2000s [1][2][3][4] and, independently, by a group of engineers in order to study phenomena arising from the competitive interaction of large numbers of small, similar and rational agents. It finds applications in Economics and Finance (distribution of wealth and salaries, optimal consumption of resources, creation of volatility in financial markets) Dynamics of Populations (the Mexican wave “la ola”, racial segregation, traffic flows). Many classical equations of Mathematics and Physics appear as particular cases of MFG equations. This theory has attracted the interest of the mathematical community for it has posed certain deep problems in the theory of PDEs, especially in infinite-dimensional spaces.

Joint work with Federica Dragoni (Cardiff University, UK).

Keywords: Mean Field Games, Hörmander’s condition, subelleptic PDEs, hypoelliptic.

References