

First Joint Meeting Brazil Italy of Mathematics
Special Session: PDE methods in mean field games and
dynamics optimization

Rio de Janeiro, August 29 - September 02, 2016

Title: Some results on focusing Mean Field Games

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Abstract: In this talk we consider stationary Mean Field Games systems in the case of local and decreasing coupling. In this setting, a typical agent is attracted by regions where his own population is highly distributed. The goal is to understand whether or not smooth solutions exist. Depending on the rate at infinity of the cost function, we observe two different situations: existence of solutions in a "subcritical" case, and non-existence in a "supercritical" case (at least if the problem is set in the whole euclidean space). This scenario is in analogy with focusing nonlinear Schrodinger equations, where the boundary between existence and non-existence of solutions is the critical Sobolev exponent. We show how blow-up techniques and Pohozaev identities apply in the MFG setting. Finally, even if in our case multiple solutions have to be expected in general (the crucial condition of Lasry-Lions is violated), we point out that in very particular situations one obtains that Nash equilibria are unique. On optimal control approaches in pedestrian dynamics.