A CUCKER-SMALE INSPIRED DETERMINISTIC MEAN FIELD GAME WITH VELOCITY INTERACTIONS

Filippo SANTAMBROGIO $^1$ and Woojoo SHIM $^2$

1) Université Claude Bernard Lyon 1, CNRS UMR 5208, Institut Camille Jordan, 43 boulevard du 11 novembre 1918, F-69622 Villeurbanne, France and Institut Universitaire de France
2) The Research Institute of Basic Sciences, Seoul National University, Seoul, KOREA

Corresponding Author: Filippo SANTAMBROGIO, santambrogio@math.univ-lyon1.fr

ABSTRACT

We introduce a mean field game model for pedestrians moving in a given domain and choosing their trajectories so as to minimize a cost including a penalization on the difference between their own velocity and that of the other agents they meet. We aims at proposing a simple model which is a bridge between some collective motion models such as the well-studied Cucker-Smale model, mainly applied to flock behavior, and the theory of Mean Field Games. We prove existence of an equilibrium in a Lagrangian setting by using its variational structure, and then study its properties and regularity.