

Existence and Weak-Strong Uniqueness of Measure Solutions to Euler-Alignment/Aw-Rascle-Zhang Model of Collective Behaviour

Ewelina Zatorska

University of Warwick, Coventry, United Kingdom
EWELINA.ZATORSKA@WARWICK.AC.UK

Abstract

I will talk about the multi-dimensional Euler-alignment system with a matrix-valued communication kernel, motivated by models of anticipation dynamics in collective behaviour. A key feature of this system is its formal equivalence to a nonlocal variant of the Aw-Rascle-Zhang (ARZ) traffic model, in which the desired velocity is modified by a nonlocal gradient interaction. We prove the global-in-time existence of measure solutions to both formulations, obtained via a single degenerate pressureless Navier-Stokes approximation. Furthermore, we establish a weak-strong uniqueness principle adapted to the pressureless setting and to nonlocal alignment forces. As a consequence, we rigorously justify the formal correspondence between the nonlocal ARZ and Euler-alignment models: they arise from the same inviscid limit, and the weak-strong uniqueness property ensures that, whenever a classical solution exists, both formulations coincide with it. The talk is based on the article [1].

References

- [1] J. Woznicki, E. Zatorska: Existence and weak-strong uniqueness of measure solutions to Euler-alignment/Aw-Rascle-Zhang model of collective behaviour. arXiv:2511.05326