
ODEs with weakly regular velocity fields and applications to the Euler and Vlasov-Poisson equations

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Abstract

I will show how the approach to ODEs with non-Lipschitz velocity field based on quantitative a priori estimates (introduced a few years ago with De Lellis) can be extended in such a way to obtain well posedness and compactness in a framework not included in the PDE theory of renormalized solutions of DiPerna-Lions and Ambrosio. This framework includes cases in which the derivative of the velocity is a singular integral of an integrable function, or even (for some components) of a measure. As a consequence, I will show how this implies existence and stability of Lagrangian solutions to the Euler and Vlasov-Poisson equations in the L^1 context. The talk will be based on various joint papers with Anna Bohun (Basel) and Francois Bouchut (Paris Est).

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