Uniqueness of weak solutions for the 2D Vlasov-Navier-Stokes system

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Abstract

We prove a uniqueness result for weak solutions to the Vlasov-Navier-Stokes system in two dimensions, both in the whole space and in the periodic case, under a mild decay condition on the initial distribution function. The main result is achieved by combining methods from optimal transportation (introduced in this context by G. Loeper) with the use of Hardy's maximal function, in order to obtain some fine Wassestein-like estimates for the difference of two solutions of the Vlasov equation.

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