

Multi-marginal optimal transport and generalized solution of Euler equations

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In this talk we present a numerical method to solve Brenier’s variational models for incompressible Euler equations. These models give rise to a relaxation in the space of measure-preserving plans of Arnold’s interpretation in terms of geodesics. The relaxation of Euler equations proposed by Brenier can be understood as requiring the resolution of a multi-marginal optimal transportation problem (aka MM-OT) with an infinite number of marginals. In order to solve numerically the MM-OT problem we regularize it by adding an entropy term so that we can re-write it as the minimization of the Kullback-Leibler distance. The new problem can be solved by using an alternate projections algorithm. Finally, we present some numerical results in dimension $d \geq 1$.

This is joint work with Jean-David Benamou and Guillaume Carlier.

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