

BEYOND ARNOLD'S GEODESIC FRAMEWORK OF AN IDEAL HYDRODYNAMICS

BORIS KHESIN

Department of Mathematics, University of Toronto, Canada

E-mail: khesin@math.toronto.edu

ABSTRACT

We discuss ramifications of Arnold's group-theoretic approach to ideal hydrodynamics as the geodesic flow for a right-invariant metric on the group of volume-preserving diffeomorphisms. We show that problems of optimal mass transport are in a sense dual to the Euler hydrodynamics. Moreover, many equations of mathematical physics, such as the motion of vortex sheets or fluids with moving boundary, have Lie groupoid, rather than Lie group, symmetries [1, 2].

This is a joint work with Anton Izosimov.

- [1] Izosimov, A. and Khesin, B. 2018, Vortex sheets and diffeomorphism groupoids. *Advances in Math.* **338**, 447-501. arXiv:1705.01603
- [2] Izosimov, A. and Khesin, B. 2022, Geometry of generalized fluid flows. Preprint. arXiv:2206.01434, 27pp.