# Fluids, diffeomorphisms, geodesics, and generalized flows

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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. It turns out that 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. We present their geodesic setting, which also allows one to describe multiphase fluids, homogenized vortex sheets and Brenier's generalized flows. This is a joint work with Anton Izosimov.