

Generalized Navier-Stokes flows

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We introduce a notion of generalized Navier-Stokes flows on manifolds, that extends to the viscous case the one defined by Brenier. Their kinetic energy extends the kinetic energy for classical Brownian flows, defined as the L^2 norm of their drift. We prove that there exists a generalized flow which realizes the infimum of kinetic energies among all generalized flows with prescribed initial and final configuration. Finally we construct generalized flows with prescribed drift and kinetic energy smaller than the L^2 norm of the drift.