On the Stochastic Approach to the Navier-Stokes Equation

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Abstract: In 1966, V. I. Arnold proved that the incompressible Euler equation is the geodesic equation on the group of volume preserving diffeomorphisms. In this talk I will first review some known results on the stochastic characterization of the incompressible Navier-Stokes equation. Then I will present a new stochastic approach to derive the incompressible Navier-Stokes equation via the stochastic dynamic program principle over the group of volume preserving diffeomorphisms. Joint work with Songzi Li and Guoping Liu.