

Asymptotic properties of isotropic brownian flows

Summary :

Stochastic flows are families of random homeomorphisms $\{\varphi_{s,t} : \mathbb{R}^d \rightarrow \mathbb{R}^d | s, t \in \mathbb{R}_+\}$ possessing the "flow" property $\varphi_{s,t+u} = \varphi_{t,t+u} \circ \varphi_{s,t}$. In this talk we will consider a special class of flows, the isotropic brownian flows, which are temporally and spatially homogeneous, and additionally rotation invariant. The one point motion of such flows is a scaled brownian motion. We will present a short overview of some asymptotic properties of this type of flows, which have been proven by purely probabilistic methods. The basic tool in this type of arguments is the analysis of the generating differential equation. However, the isotropic brownian flows cannot be viewed as solutions of classical SDE, but as solutions of Kunita-type SDE, involving Kunita-type stochastic integrals. We will provide some short introduction to this type of integrals by comparing them with the classical Itô integrals. Finally we will consider the isotropic brownian flows as random dynamical systems and discuss the difficulties and the possible gains of this approach.