

Multidimensional SDEs with distributional drift

Elena Issoglio
King's College London

Abstract

We consider a multidimensional stochastic differential equation with a time-dependent drift given by a distribution in a suitable class of Sobolev spaces with negative order. We show existence and uniqueness of a *virtual solution* for this singular SDE making use of a multidimensional Zvonkin type transform. In particular, we consider an auxiliary PDE whose coefficients are distributions and which is closely related to the Kolmogorov equation relative to the SDE. We show that there exists a function solution to this PDE and by using this solution we transform the singular SDE to a new SDE. For the latter we can show existence and uniqueness of a weak solution.

This is a joint work with F. Flandoli and F. Russo.