

Séminaire de Probabilités et Statistique

Mardi 08 novembre 2022 à 14h00

Laboratoire Dieudonné

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Supelec

Regularisation by noise for SDEs with distributional drift

We study existence and uniqueness of solutions to the equation $dX_t = b(X_t)dt + dB_t$, where b is a distribution in some Besov space and B is a fractional Brownian motion with Hurst parameter $H \leq 1/2$. Two independent approaches will be presented: First, the equation is understood as a nonlinear Young equation. This involves a nonlinear Young integral constructed in the space of functions with finite p -variation, which is well suited when b is a nonnegative (or nonpositive) distribution. Using this construction and fine properties of the local time of B , we prove existence of weak solutions (in the probabilistic sense) for $H < \sqrt{2} - 1$, when b is a finite positive measure. Secondly, we use recent extensions of the stochastic sewing lemma in combination with regularising properties of the fractional Brownian motion to establish pathwise uniqueness and to construct strong solutions via a regularisation of b .

Based on joint work with Alexandre Richard and Etienne Tanré.

<https://arxiv.org/abs/2112.05685>