Extending Stochastic Calculus As Far As It Will Go In The Direction of Skorohod Integration

Frederi Viens
Purdue University

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We improve on an idea of Patrick Cheridito (Princeton) and David Nualart (Barcelona) in order to establish Itô formulas for a class of Gaussian stochastic processes that is much wider than the fractional Brownian scale.

Among other things, we introduce a new canonical Hilbert space for Skorohod integrals. This helps us propose a theory that goes far beyond the Skorohod stochastic calculus for fractional Brownian motion. We will discuss generalizations of the formulas of Itô and Tanaka, stochastic ordinary and partial differential equations, as well as regularity issues.

This is joint work with Oana Mocioalca (Kent State), and will appear in the Journal of Functional Analysis.