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On the integration with respect to Volterra processes: fractional calculus and approximation

based on joint works with Yuliya Mishura, Kostia Ralchenko, Erik H. Karlsen

In the first part we discuss a pathwise integration for Volterra processes driven by Lévy noise or martingale noise based on fractional calculus. We obtain an integral with respect to a non-semimartingale process. Different from other recent approaches, this integration provides a framework for modelling where it is easy to keep track of the information flow. Then it can be attractive for applications, for example in finance and energy finance, where information is often linked to portfolio management and control. Then we study an approximation of the integrals introduced above based on the perturbation of the noise, which provides a semimartingale approximation of the integral. This turns to be interesting for simulations.