

Functional Itô formula and Taylor expansion for non-anticipative maps of rough paths

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Abstract

We rely on the approximation properties of the signature of càdlàg rough paths to derive a functional Itô formula for non-anticipative maps of rough paths. This leads to a functional extension of the Itô formula for càdlàg rough paths (by Friz and Zhang (2018)) which coincides with the change of variable formula formulated by Dupire (2009) as well as by Cont and Fournie (2010), whenever the notions of integration coincide.

As a byproduct, we show that sufficiently regular non-anticipative path functionals admit a functional Taylor expansion, leading to a far reaching generalization of the recently established results by Dupire and Tissot-Daguette (2022).

The talk is based on ongoing joint work with Xin Guo and Francesca Primavera.