

**Rough paths analysis
of the fractional Brownian motion
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Using anticipating calculus, L. Coutin and Z. Qian [1] have constructed geometric rough paths above the trajectories of the fractional Brownian motion W^H with Hurst parameter $H > \frac{1}{4}$. In [4] we study large deviation properties of these rough paths in the topology of p -variation, This extends results proved by M. Ledoux, Z. Qian and T. Zhang [2] for the rough paths above the trajectories of the Brownian motion. The *universal limit theorem* in [3] allows to transfer these properties to some dynamical systems driven by a fractional Brownian motion. As a by-product of our study, geometric rough paths above the elements of the reproducing kernel Hilbert space of the fractional Brownian motion are obtained and an explicit integral representation is given.

References

- [1] L. Coutin, Z. Qian : Stochastic analysis, rough path analysis and fractional Brownian motions. *Probab. Theory Relat. Fields* 122, 108-140 (2002).
- [2] M. Ledoux, Z. Qian, T. Zhang : Large deviations and support theorem for diffusion processes via rough paths. *Stoch. Proc. and their Appl.* 102, 265-283 (2002).
- [3] T. Lyons, Z. Qian : System control and rough paths. Oxford Mathematical Monographs. Oxford Science Publications. Clarendon Press. Oxford, 2002.
- [4] A. Millet, M. Sanz-Solé, Large deviations for rough paths of the fractional Brownian motion, arXiv math.PR/0412200, December 2004.