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Strong approximation of the multi-order fractional Brownian motion

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Abstract

Since the work of Cheridito [1] which has made a significant contributions in financial modeling, many mixed processes have been proposed and examined, including the fractional mixed fractional Brownian motion (fBm) [3], the completely correlated mixed fBm [2], the multi-order fBm [4] as examples among others. Such a processes are non-stationary Gaussian and characterized at least by two Hurst indices. As a result the so-called mixed self-similarity arises. These processes have been proposed as an extension of the fBm. Here, we continue the investigation of the multi-order fBm introduced in [4]. More precisely, we provide the Paley-Wiener-Zygmund representation of the nth order fBm (e.g., [5]), then by means of transport processes we construct a strong uniform approximation of the multi-order fBm on [0, 1] with the corresponding rate of convegence.

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