Eisenbaum, Nathalie; **Shi, Zhan**

Uniform oscillations of the local time of iterated Brownian motion. (English) Zbl 0930.60056

Bernoulli 5, No. 1, 49-65 (1999).

Consider the so-called "iterated Brownian motion", i.e. a real-valued process $Z(t)$, $t \geq 0$, defined as $Z(t) = X_+(Y(t))$ if $Y(t) \geq 0$ and $Z(t) = X_-(Y(t))$ if $Y(t) < 0$, where $X_+(t)$, $X_-(t)$, $Y(t)$ are three independent standard Brownian motions. Denote by $L_t^x(Z)$, $t \geq 0$, $x \in R$, the local time process of Z; put $\omega(h)$ for the unifom modulus of continuity and $\eta(h)$ for the modulus of nondifferentiability of $t \to L_t^x(Z)$. The authors use the links between $L_t^x(Z)$ and Bessel processes, particularly, Ray-Knight theorems for the investigation of an asymptotics of $\omega(h)$ and $\eta(h)$ as $h \to 0$. They prove that $h^{3/4}|\log h|^{3/4}$ is a correct rate for $\omega(h)$ and $h^{-3/4}|\log h|^{3/4}$ determines the exact order of magnitude of $\eta(h)$ for small h.

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