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Freidlin-Wentzell large deviations in Hölder norm. (Grandes déviations de Freidlin-Wentzell en norme Höldérienne.) (French) Zbl 0811.60019

Azéma, Jacques (ed.) et al., Séminaire de Probabilités XXVIII. Berlin: Springer-Verlag. Lect. Notes Math. 1583, 293-299 (1994).

The authors prove that the Freidlin-Wentzell large deviation principle for small perturbations of dynamical systems can be extended to the Hölder topology of index α for all $0 < \alpha < 1/2$. More precisely if for all functions $w : [0,1] \to \mathbb{R}^d$ the Hölder norm of index α is defined by

$$\|w\|_\alpha = \sup_{0\le s\le t\le 1} \frac{|w(s)-w(t)|}{|t-s|^\alpha},$$

then if $0 < \alpha < 1/2$, for all $x \in \mathbb{R}^d$ and for all Borel sets of $C_x([0,1],\mathbb{R}^d)$:

$$-\Lambda(\mathring{A}) \le \liminf_{\varepsilon\to 0} \varepsilon^2 \text{Log } P(X_\varepsilon^x \in A) \le \limsup_{\varepsilon\to 0} \varepsilon^2 \text{Log } P(X_\varepsilon^x \in A) \le -\Lambda(\overline{A}),$$

$\mathring{A}$ and $\overline{A}$ are respectively the interior and the closure of A for the Hölder topology of index α and

$$\Lambda(A) = \inf\big(\tfrac{1}{2}|h|^2;\ h \in H, \varphi^x(h) \in A\big),$$

$$X_\varepsilon^x(t) = x + \varepsilon \int_0^t \sigma(X_\varepsilon^x(s))dw(s) + \int_0^t b_\varepsilon(X_\varepsilon^x(s))ds, \qquad 0 \le t \le 1,$$

b is the uniform limit of b_ε, and $\varphi^x(h)$ is the solution of the ordinary differential equation

$$\varphi^x(h)(t) = x + \int_0^t \sigma(\varphi^x(h)(s))\dot{h}(s)ds + \int_0^t b(\varphi^x(h)(s))ds, \qquad 0 \le t \le 1.$$

For the entire collection see [Zbl 0797.00020].

Reviewer: J.-P.Lepeltier (Le Mans)

MSC:

60F10 Large deviations

Keywords:

Freidlin-Wentzell large deviation principle; small perturbations; Hölder norm

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