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Stochastic flows associated with Stratonovich curve-line integrals. (English) Zbl 1351.60079
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Summary: In this paper, Stratonovich curve-line integrals are used to describe the evolution of a stochastic flow driven by some noncommuting vector fields and independent double Wiener processes. In fact, we analyze the corresponding stochastic evolution of a stochastic flow driven by noncommuting vector fields $\{g_1, \dots, g_m\}$ and independent double Wiener processes

$$\{W^i(t) = (W_1^i(t_1), W_2^i(t_2)) \in \mathbb{R}^2 : t = (t_1, t_2) \in D\}, 1 \leq i \leq m.$$

It is a significant generalization of the case $m = 1$, considered in a joint work of *V. Damian* and *C. Vărsan* [*Math. Rep., Buchar.* 14(64), No. 4, 325–332 (2012; [Zbl 1289.60114](#))]. This paper contains two open problems; a good start for a future research.

MSC:

60H15 Stochastic partial differential equations (aspects of stochastic analysis)

Keywords:

Stratonovich curve-line integral equations; gradient systems; curve-line stochastic equations

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