

Peskir, Goran

A change-of-variable formula with local time on curves. (English) Zbl 1085.60033
J. Theor. Probab. 18, No. 3, 499-535 (2005).

Let $X = (X_t)_{t \geq 0}$ be a continuous semimartingale and let $b : \mathbb{R}_+ \rightarrow \mathbb{R}$ be a continuous function of bounded variation. Setting $C = \{(t, x) \in \mathbb{R}_+ \times \mathbb{R} \mid x < b(t)\}$ and $D = \{(t, x) \in \mathbb{R}_+ \times \mathbb{R} \mid x > b(t)\}$, suppose that a continuous function $F : \mathbb{R}_+ \times \mathbb{R} \rightarrow \mathbb{R}$ is given such that F is $C^{1,2}$ on \bar{C} and F is $C^{1,2}$ on \bar{D} . Then the change-of-variable formula to $F(t, X_t)$ with the local time of X at the curve b is proved. A version of the same formula derived for an Itô diffusion X under weaker conditions on F has found applications in free-boundary problems of optimal stopping.

Reviewer: [Yuhu Feng \(Shanghai\)](#)

MSC:

[60H05](#) Stochastic integrals
[60G44](#) Martingales with continuous parameter

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Keywords:

[Itô's formula](#); [Tanaka's formula](#); [Brownian motion](#); [diffusion](#); [continuous semimartingale](#); [stochastic integral](#); [free-boundary problems](#); [optimal stopping](#)

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References:

- [1] Pedersen J.L., Peskir G. (2002). On nonlinear integral equations arising in problems of optimal stopping. Proc. Funct. Anal. VII (Dubrovnik 2001), Various Publ. Ser. No. 46, 159–175 · [Zbl 1031.60030](#)

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