Necessary conditions for optimality for a diffusion with a non-smooth drift

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Abstract :

The purpose of this paper is to establish the necessary conditions for optimality of a controlled stochastic differential system without differentiability assumptions on the drift. We use an approximation argument in order to obtain a sequence of smooth control problems, and we apply Ekeland's variational principle to derive the associated adjoint processes. Passing at the Limit with respect to the stable convergence, we obtain a weak adjoint process and the inequality between Hamiltonians. This result is a generalisation of Kushner's maximum principle .

Keywords :

- Maximum principle,
- adjoint process,
- variational principle,
- stable convergence

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