

SUR LES SOLUTIONS FAIBLES D'EQUATIONS DIFFERENTIELLES
STOCHASTIQUES

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Abstract: A characterization of the existence of the solutions of stochastic differential equations on R - for any initial data - has been given by Engelbert and Schmidt in [5]. In this paper we propose to give a necessary and sufficient condition for the equation

$$X_t = x_0 + \int_0^t \sigma(X_s) dB_s \quad (*)$$

to admit a weak solution. By using a theorem of convergence for continuous local martingals and its connection with the local time, we prove a lemma which generalizes theorem (3) of [3]. Then we deduce that if equation (*) admits a solution verifying $\langle x \rangle_\infty = +\infty$, then the diffusion coefficient σ cannot vanish on strictly positive Lebesgue measure set and, if $\sigma(x_0) \neq 0$, then σ^{-2} is locally integrable in a neighbourhood of x_0 . We finish with an extending the preceding results to equations with no zero drift.

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