EXISTENCE AND NON-EXISTENCE OF SOLUTIONS OF ONE-DIMENSIONAL STOCHASTIC EQUATIONS

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Abstract: We consider the one-dimensional stochastic equation

$$X_t = x_0 + \int_0^t b(X_s) d\langle M \rangle_s + \int_0^t \sigma(X_s) dM_s$$

for a continuous local martingale M with square variation $\langle M \rangle$ and measurable drift and diffusion coefficients b and σ. The main purpose of this paper is to derive a necessary condition for the existence of a solution X starting from x_0. As a result, we construct a diffusion coefficient σ such that the above stochastic equation has no solution X whatever the initial value x_0 and the non-zero, say, continuous drift coefficient b might be.

1991 AMS Mathematics Subject Classification: 60H10, 60G44.

Key words and phrases: Stochastic equations, continuous local martingales, non-existence, local time.

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