Deelstra, G.; **Delbaen, F.**

Convergence of discretized stochastic (interest rate) processes with stochastic drift term.

(English) Zbl 0915.60064
Appl. Stochastic Models Data Anal. 14, No. 1, 77-84 (1998).

The authors study the stochastic differential equation

$$dX_s = (2\beta X_s + \delta_s)ds + g(X_s)dB_s, \quad s \in \mathbb{R}^+,$$

with $X_0 \geq 0$, $\beta \leq 0$, where g is a function vanishing at zero which satisfies the Hölder condition: $|g(x) - g(y)| \leq b|x - y|^{1/2}$ and δ_s is a measurable and adapted stochastic process such that $\int_0^t \delta_u du < \infty$ a.e. The authors discuss the Euler discretization scheme for this stochastic differential equation with a drift term which may depend on a stochastic process with random correlation. It is shown that the approximating solution converges in L^1-supnorm and H^1-norm to the solution of this differential equation. The authors find conditions under which the Euler scheme strongly converges with order $v = 0.5$ at time T. The authors note that this stochastic differential equation may be applied in finance.

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MSC:

60H10 Stochastic ordinary differential equations (aspects of stochastic analysis)
62P20 Applications of statistics to economics

Keywords:

stochastic differential equation; stochastic drift term; Hölder condition; Euler discretization scheme; strong convergence

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