A STOCHASTIC FRACTIONAL BACKWARD VOLTERRA INTEGRAL EQUATION

Wilfried Grecksch

Institute of Mathematics, Martin-Luther-University Halle-Wittenberg, D-06099 Halle(Saale), Germany
[wilfried.grecksch@mathematik.uni-halle.de]

2000 Mathematics Subject Classification. 60H20, 60H30

Keywords and phrases. Fractional Brownian motion, Volterra stochastic backward equation.

Let $(B^h(t))_{t\in[0,T]}$ be a real fractional Brownian motion on a given complete probability space $(\Omega, \mathcal{F}, P)$. We introduce a fractional backward stochastic Volterra equation for processes of type

$$Y(t) = \psi(t) + \int_t^T h(t,s,Y(s),Z(t,s),Z(s,t))ds$$

,

$$- \int_t^T Z(t,s)dB^h(s), \;\; t \in [0,T]$$

where the stochastic integral is defined in Skorochod sense and $Y(\cdot)$ $Z(\cdot,\cdot)$ are the solution processes. Conditions are given for the stochastic process $\psi(\cdot)$ and the real function $f(\cdot,\cdot,\cdot,\cdot,\cdot)$ so that the well-posedness of the problem can be proven. A fractional Clark-Ocone formula [2] is used. A duality relation between a linear forward stochastic Volterra equation and a linear backward stochastic Volterra equation is also showed. Ideas from [1] are used.

REFERENCES

[1] V. Anh, W. Grecksch, J. Yong, *Regularity of Backward Stochastic Volterra Integral Equations in Hilbert Spaces*, to appear in Stochastic Analysis and Applications (2010).

[2] Chr. Bender, R. J. Elliott, *On the Clark-Ocone Theorem for Fractional Brownian Motions with Hurst Parameter bigger than a Half*, Stochastics An International Journal of Probability and Stochastic Processes, **75** (2003), No. 6, pp 391 - 405.