BSDE Driven by G-Brownian Motion

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Abstract: How to prove the well-posedness of backward stochastic differential equation under the framework of nonlinear expectation–G-expectation– is a very interesting and challenging problem. In this paper, we study the following of backward stochastic differential equations driven by a G-Brownian motion $(B_t)_{t\geq 0}$:

$$\begin{aligned} Y_t &= \xi + \int_t^T f(s, Y_s, Z_s)ds + \int_t^T g(s, Y_s, Z_s)d\langle B\rangle_s \\ &\quad - \int_t^T Z_s dB_s - (K_T - K_t), \end{aligned}$$

where $\xi \in L_G^p(\Omega_T)$ is a given terminal condition. The generators f and g of this BSDE satisfy a standard Lipschitz condition in (y, z). The existence and uniqueness of the solution (Y, Z, K) is proved, where K is a decreasing G -martingale. Some very useful a priori estimates have been obtained.