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PONTRYAGIN'S RISK-SENSITIVE STOCHASTIC MAXIMUM PRINCIPLE FOR FRACTIONAL BACKWARD STOCHASTIC DIFFERENTIAL EQUATIONS VIA MALLIAVIN CALCULUS

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SUMMARY

In this work, we study the risk-sensitive optimal control problem for a backward stochastic system driven by a fractional Brownian motion with Hurst parameter $H \in (\frac{1}{2}, 1)$. We make the Malliavin derivative interfere to establish the necessary and sufficient optimality conditions, for a risk-sensitive optimal control of this kind of equations. The control domain is assumed convex and the driver of the system depends on the control variable. As a preliminary step, we study the risk-neutral problem whose optimal solution exists. This is an extension of initial control system to this type of problem, where the set of admissible controls is convex. An example to be carried out to illustrate our main result of risk-sensitive control problem under linear stochastic dynamics with exponential quadratic cost function.

Keywords and phrases: Backward Stochastic Differential Equation, Fractional Brownian motion, Malliavin derivative, Risk-sensitive, Stochastic Maximum principle, Variational principle, Logarithmic Transformation.

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