ITÔ STOCHASTIC DIFFERENTIAL EQUATIONS DRIVEN BY FRACTIONAL BROWNIAN MOTIONS OF HURST PARAMETER $H > 1/2$

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Abstract: This talk will present a result on existence and uniqueness of solution of Itô type stochastic differential equation $dx(t) = b(t, x(t))dt + \sigma(t, x(t))dB(t)$, where $B(t)$ is a fractional Brownian motion of Hurst parameter $H > 1/2$ and $dB(t)$ is the Itô differential defined by using Wick product or divergence operator. The coefficients b and σ are random and anticipative. Using the relationship between the Itô and pathwise integrals we first write the equation as a stochastic differential equation involving pathwise integral plus a Malliavin derivative term. To handle this Malliavin derivative term the equation is then further reduced to a system of characteristic equations without Malliavin derivative, which is then solved by a careful analysis of Picard iteration, with a new technique to replace the Gronwall lemma which is no longer applicable. The solution of this system of characteristic equations is then applied to solve the original Itô stochastic differential equation up to a positive random time. In special linear and quasilinear cases the global solutions are proved to exist uniquely.