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ABOUT FRACTIONAL STOCHASTIC FUZZY DIFFERENTIAL EQUATIONS

Consider a fuzzy stochastic differential equation with fractional-like integrals of the form

$$X(t) = X_0 + \int_0^t (t-s)^{\alpha-1} f(s,\ X(s))\, ds + \left\langle \int_0^t (t-s)^{\alpha-1} g(s,\ X(s))\, dB_H(s) \right\rangle, \quad (1)$$

where $0 < \alpha < 1, B_H$ is a fractional Brownian motion with Hurst exponent $H \in (1/2, 1),\ X_0 : \Omega \to \mathcal{F}(\mathbb{R})$ is a fuzzy random variable, mappings

$$f : I \times \Omega \times \mathcal{F}(\mathbb{R}) \to \mathcal{F}(\mathbb{R}), \quad g : I \times \Omega \times \mathcal{F}(\mathbb{R}) \to \mathbb{R}.$$

Theorem. Let fuzzy mappings f, g satisfy Lipschitz type and growth conditions and let $X_0 \in L^2(\Omega, \mathcal{A}, \mathbb{P}; \mathcal{F}(\mathbb{R}))$. Then equation (1) has a single stochastic strong solution.