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Parabolic Anderson model with a fractional Gaussian noise that is rough in time

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Abstract

This paper concerns the parabolic Anderson equation

$$\frac{\partial u}{\partial t} = \frac{1}{2}\Delta u + u\frac{\partial^{d+1} W^{\mathbf{H}}}{\partial t \partial x_1 \cdots \partial x_d}$$

generated by a $(d+1)$-dimensional fractional noise with the Hurst parameter $\mathbf{H} = (H_0, H_1, \cdots, H_d)$ with special interest in the setting that some of $H_0, \cdots, H_d$ are less than half. In a speaker's recent work, the case of the spatial roughness has been investigated. To put the last piece of the puzzle in place, this work investigates the case when $H_0 < 1/2$ with the concern on solvability, Feynman-Kac's moment formula and intermittency of the system.