

ON THE FRACTIONAL ANISOTROPIC WIENER FIELD

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Abstract: In this paper we study the local properties of the fractional anisotropic Wiener field $\{B^{(\alpha)}(t) : t \in R^d\}$, where $\alpha = (\alpha_1, \dots, \alpha_d)$, $0 < \alpha_i < 2$. It is proved that, with probability 1, the realizations of the field $B^{(\alpha)}$ over any cube $Q \subset R^d$ belong to the anisotropic Hölder class with parameter $\alpha/2$ in the Orlicz norm corresponding to the Young function $\mathcal{M}_2 = \exp(t^2) - 1$. Other supporting spaces are treated as well. Moreover, the box dimension of the graph of the realization of $B^{(\alpha)}$ has been calculated; it is proved that, with probability 1, the box dimension of the graph of the realization of $B^{(\alpha)}$ over any cube $Q \subset R^d$ is equal to $d + 1 - \kappa/2$, where $\kappa = \min(\alpha_1, \dots, \alpha_d)$.

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