Small Deviation for Gaussian Random Fields

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Abstract

The d-dimensional Slepian Gaussian random field $\{S(\mathbf{t}), \mathbf{t} \in \mathbb{R}_+^d\}$ is a mean zero Gaussian process with covariance function

$$\mathbb{E}\, S(\mathbf{t})S(\mathbf{s}) = \prod_{i=1}^{d} \max(0, a_i - |s_i - t_i|).$$

In this paper, we study the small deviation probability of two-dimensional Slepian Gaussian fields. Riesz product from Fourier Analysis is the key. Once applied to Brownian sheets, our method provides a simpler proof of the well known result about the small deviation rate under the sup-norm.

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