ℓ_p valued Gaussian processes: large deviations

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Let $\mathbf{X}(t) = \{X_k(t), k \geq 1\}$ be a Gaussian random process such that for any t, $\mathbf{X}(t) \in \ell_p$ a.s. and $||\mathbf{X}(t)||_p$, $t \in [0, T]$ is a.s. continuous. The tail of the distribution function of

$$\max_{[0,T]} ||\mathbf{X}(t)||_p^p$$

is the subject of our interest. By duality, a study of it can be reduced to Gaussian fields indexed in ℓ_p. In order to evaluate the asymptotic behavior a comparison method is presented. Main point of the method is a construction of an example of smooth Gaussian field indexed in ℓ_2 and subjected to the evaluation.