

Small deviation of Gaussian processes in L_q -spaces

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The presented results are contained in two joint papers with Mikhail Lifshits and Zhan Shi. In 1988 B. Carl, Th. Kühn and St. Heinrich proved upper entropy estimates for Hölder continuous operators u from a Hilbert space H into $C(K)$ in terms of compactness properties of the metric space K . Let μ be a finite Borel measure on K and regard now u as operator from H into $L_q(K, \mu)$ for some $q \in [1, \infty)$. Then we investigate the problem of upper estimates for $e_n(u : H \rightarrow L_q(K, \mu))$ in terms of q and certain "compactness" properties of μ . Therefore we introduce the notions of inner and outer mixed entropy of μ and show how these quantities lead to sharp entropy estimates for L_q -valued Hölder continuous operators. For self-similar fractal measures μ on \mathbb{R}^N these entropies may be calculated directly. Finally, we introduce some property of u (called locally non-determinism) leading to general lower entropy estimates for operators from H into $C(K)$.