PATH REGULARITY OF GAUSSIAN PROCESSES VIA SMALL DEVIATIONS

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Abstract: We study the a.s. sample path regularity of Gaussian processes. To this end we relate the path regularity directly to the theory of small deviations. In particular, we show that if the process is n-times differentiable, then the exponential rate of decay of its small deviations is at most $\varepsilon^{-1/n}$. We also show a similar result if n is not an integer.

Further generalizations are given, which parallel the entropy method to determine the small deviations. In particular, the present approach seems to be a probabilistic interpretation of the multiplicativity property of the entropy numbers.

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