

**Li, W. V.; Shao, Q.-M.**

**Gaussian processes: Inequalities, small ball probabilities and applications.** (English)

Zbl 0987.60053

Shanbhag, D. N. (ed.) et al., Stochastic processes: Theory and methods. Amsterdam: North-Holland/Elsevier. Handb. Stat. 19, 533-597 (2001).

Let  $\mu$  be a Gaussian measure on a real separable Banach space  $E$  equipped with its Borel  $\sigma$ -field  $\mathcal{B}$  and with norm  $\|\cdot\|$ . The small ball probability (or small deviation) for Gaussian measure studies the behaviour of  $\log \mu(x : \|x\| \leq \varepsilon)$  as  $\varepsilon \rightarrow 0$ . The topics presented by the authors for Gaussian processes are part of the general theory (of small deviation). The organization of this paper is as follows. Section 2 summarizes various inequalities for Gaussian processes or for Gaussian random variables. The emphasis is on comparison inequalities and correlation inequalities which play an important role in small ball estimates. In Section 3, the authors present small ball probabilities in the general setting. The links with metric entropy and Laplacian transforms are elaborated. Sections 4 and 5 pay special attention to Gaussian processes with index set in  $\mathbb{R}$  and  $\mathbb{R}^d$ , respectively. In Section 6, they give exact values of small ball constants for certain special processes. Various applications are discussed in Section 7.

For the entire collection see [Zbl 0961.60001].

Reviewer: Anatoli Mogulskij (Novosibirsk)

**MSC:**

60G15 Gaussian processes

60E15 Inequalities; stochastic orderings

Cited in 140 Documents

**Keywords:**

small deviations; isoperimetric inequalities; concentration and deviation inequalities; comparison inequalities; correlation inequalities; metric entropy; exponential Tauberian theorem; fractional Brownian motions; Chung's laws of the iterated logarithm