LIMIT THEOREM FOR HIGH LEVEL A-UPCROSSINGS BY χ-PROCESS

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Properties of high level intersection sets by trajectories of Gaussian random processes on infinitely increasing time horizon are well elaborated, see [2], [3] and references therein. Many important results in this direction have been obtained for Gaussian fields, [3]. In contrast, there are only few results about limit behavior of the number of large excursions of Gaussian vector processes. First Poisson limit theorem for a-exit points over level u, where Gaussian vector process of arbitrary dimension was investigated, was established in [4]. The present paper deals with A-upcrossing (A-exit) points over high level u. We use similar technic as in [4]. We consider the stationary random process

$$\chi(t) = \left(X_1^2(t) + X_2^2(t) + ... + X_n^2(t)\right)^{1/2} = ||\mathbf{X}(t)||, \quad t \in \mathbb{R},$$

where $\mathbf{X}(t) = (X_1(t), X_2(t), ..., X_n(t))$ is a Gaussian vector process which components are independent copies of a Gaussian stationary process $X(t)$ with mean zero and covariance function $r(t)$. We assume that

$$r(t) = 1 - |t|^\alpha + o(|t|^\alpha) \text{ as } t \to 0, \text{ for some } 0 < \alpha \leq 2,$$

and

$$r(t) = O\left(\frac{1}{\log t}\right) \text{ as } t \to \infty.$$

The aim of this paper is to prove a Poisson limit theorem for A-points of upcrossings of a high level by trajectories of the process $\chi(t)$.

References

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