

1127-60-203

**Dan Cheng\*** ([cheng.stats@gmail.com](mailto:cheng.stats@gmail.com)), 1108 Memorial Circle, Lubbock, TX 79409, and **Yimin Xiao**. *The expected Euler characteristic approximation for Gaussian vector fields.*

Let  $\{(X(t), Y(s)) : t \in T, s \in S\}$  be an  $\mathbb{R}^2$ -valued, centered, unit-variance smooth Gaussian vector field, where  $T$  and  $S$  are rectangles in  $\mathbb{R}^N$ ; and let  $A_u = \{(t, s) \in T \times S : X(t) \geq u, Y(s) \geq u\}$  be the excursion set. It is shown that, as  $u \rightarrow \infty$ , the excursion probability  $\mathbb{P}\{\sup_{t \in T} X(t) \geq u, \sup_{s \in S} Y(s) \geq u\}$  can be approximated by  $\mathbb{E}\{\chi(A_u)\}$ , the expected Euler characteristic of  $A_u$ , such that the error is super-exponentially small. This verifies the expected Euler characteristic heuristic for a large class of smooth Gaussian vector fields. (Received February 03, 2017)