

**Breitung, K.**

**Asymptotic approximations for multinormal domain and surface integrals.** (English)

Zbl 0571.73100

System modelling and optimization, Proc. 11th IFIP Conf., Copenhagen 1983, Lect. Notes Control Inf. Sci. 59, 577-584 (1984).

[For the entire collection see [Zbl 0538.00033](#).]

A method has been outlined for obtaining simple asymptotic approximations for multinormal domain and surface integrals by expanding the function defining the boundary of the domain or the given surface at the points with minimal distance to the origin. The results show, that it is necessary to take into account the curvatures of the surface at these points, even when they are small. Therefore, the application of the so-called "first-order-reliability-methods", where the probability content of a domain in the space of  $n$  independent standard normal distributed variables is estimated by  $\Phi(-\beta)$ , where  $\beta$  is the distance of the domain to the origin, does not give correct results. The formula for the crossing rates of Gaussian vector processes is valid only, if the value of the process  $\underline{x}(t)$  and its derivative process  $\underline{x}'(t)$  at each time  $t$  are independent.

**MSC:**

74K99 Thin bodies, structures

60G15 Gaussian processes

Cited in **35** Documents

**Keywords:**

asymptotic approximations for multinormal domain and surface integrals; points with minimal distance to the origin; curvatures of the surface at these points; first-order-reliability-methods; not give correct results; crossing rates of Gaussian vector processes