

The Self-Intersections of a Gaussian Random Field

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Abstract: Let $X(t)$ be a $(N, d, \bar{\alpha})$ non-deterministic Gaussian field. In this paper, the sufficient condition of existence of the k multiple points, the Hausdorff measure and Hausdorff dimension for the k -multiple times set $\{(t_1, t_2, \dots, t_k) : X(t_1) = X(t_2) = \dots = X(t_k), \text{ for distinct } t_1, t_2, \dots, t_k\}$ and the local times of the self-intersection process $Y(T) = \{X(t_2) - X(t_1), \dots, X(t_k) - X(t_{k-1})\}$ of $X(t)$ are evaluated.