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An estimate on the supremum of a nice class of stochastic integrals and U-statistics. (English)

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Probab. Theory Relat. Fields 134, No. 3, 489-537 (2006).

The paper aims to bound the upper tail probability of the supremum of appropriate classes of multiple integrals with respect to a normalized empirical measure. This problem is closely related to the study of the supremum of classes of degenerate U -statistics. Let ξ_1, \dots, ξ_n be a sequence of independent and identically distributed random variables on a given space (X, χ) with distribution μ . Let \mathcal{F} denote a class of functions of k variables on the product space (X^k, χ^k) . For all $f \in \mathcal{F}$ we consider the random integral $J_{n,k}(f)$ of the function f with respect to the k -fold product of the normalized signed measure $\sqrt{n}(\mu_n - \mu)$, where μ_n denotes the empirical measure defined by the random variables ξ_1, \dots, ξ_n . The paper gives bounds for the probabilities $P(\sup_{f \in \mathcal{F}} |J_{n,k}(f)| \geq x)$ for all $x > 0$. The results provide an improvement of similar bounds for degenerate U -statistics found by *M. Arcones* and *E. Giné* [Stoch. Proc. Appl. 52, 17–38 (1994; Zbl 0807.62014)], where the kernels constitute a Vapnik-Červonenkis class.

Reviewer: [Neville Weber \(Sydney\)](#)

MSC:

- 62G20 Asymptotic properties of nonparametric inference
- 60H05 Stochastic integrals
- 60E15 Inequalities; stochastic orderings
- 62E20 Asymptotic distribution theory in statistics

Cited in **9** Documents

Keywords:

degenerate U-statistics; supremum bounds

Full Text: [DOI](#)

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