

Random chaoses and U -statistics

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In the first part of the talk we will review two-sided bounds for moments and tails of random chaoses of the form

$$\sum_{1 \leq i_1 < i_2 < \dots < i_d \leq n} a_{i_1, \dots, i_d} X_{i_1} X_{i_2} \cdots X_{i_d},$$

where X_1, X_2, \dots, X_n are independent (nonnegative or symmetric) random variables.

In the second part we will show how some of the upper estimates for chaoses may be extended to the case of U -statistics, i.e. random variables of the form

$$\sum_{1 \leq i_1 < i_2 < \dots < i_d \leq n} h_{i_1, \dots, i_d}(X_{i_1}, X_{i_2}, \dots, X_{i_d}).$$

As an application we will present necessary and sufficient conditions for the law of the iterated logarithm for canonical U -statistics.