Desigualtats de concentració

Abstract:

It is shown that functions defined on $\{0, 1, ..., r-1\}^n$; satisfying certain conditions of bounded differences that guarantee subgaussian tail behavior also satisfy a much stronger local subgaussian property. For self-bounding and configuration functions we derive analogous locally subexponential behavior. The key tool is Talagrand's variance inequality for functions defined on the binary hypercube which we extend to functions of uniformly distributed random variables defined on $\{0, 1, ..., r-1\}^n$ for $r \geq 2$.

Abstract: A general method for obtaining moment inequalities for functions of independent random variables is presented. It is a generalization of the entropy method which has been used to derive concentration inequalities for such functions, and is based on a generalized tensorization inequality due to Lata la and Oleszkiewicz. The new inequalities prove to be a versatile tool in a wide range of applications. We illustrate the power of the method by showing how it can be used to effortlessly re-derive classical inequalities including Rosenthal and Kahane-Khinchine-type inequalities for sums of independent random variables, moment inequalities for suprema of empirical processes, and moment inequalities for Rademacher chaos and U-statistics. Some of these corollaries are apparently new. In particular, we generalize Talagrand's exponential inequality for Rademacher chaos of order two to any order. We also discuss applications for other complex functions of independent random variables, such as suprema of boolean polynomials which include, as special cases, subgraph counting problems in random graphs.