

Improved Hölder inequalities for correlated Gaussian random vectors

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joint work with W.K. Chen and G. Paouris

Abstract

We propose algebraic criteria that yield sharp Hölder-type inequalities for the product of functions of Gaussian random vectors with arbitrary covariance structure. While our lower inequality appears to be new, we prove that the upper inequality gives an equivalent formulation of the Brascamp-Lieb inequality. We will show that our result generalizes Nelson's hypercontractivity as well as its reverse, and the sharp Young and reverse Young inequalities. Moreover, we will give two applications: Prékopa-Leindler and Barthe inequalities.