Colloquium del Departamento

de Análisis Matemático

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"Approximation of the entries of a random haar ortogonal matrix by i.i.d. normal random variables"

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a las 13:00 horas en el seminario 222

Abstract:

In this talk we address the problem of how many entries of a Haar distributed orthogonal matrix can be jointly approximated by i.i.d. normal random variables. In particular, we will discuss how good is the approximation when the Haar orthogonal matrix is the orthogonal matrix appearing in either the Gram-Schmidt orthonormalization or the polar decomposition of a Gaussian matrix.

Let Y (n) be a gaussian random matrix of order n and a $O(n)$ be Haar distributed orthogonal matrix dfined in the same probability space. If F_i^m denotes the vector formed by the first m-coordinates of the ith row of $Y(n)$ - $\sqrt{n}\,O(n)$ and $\alpha = \frac{m}{n}$ our main result shows concentration on this quantities for the two cases considered.

To show the extent of this result, we use it to study the convergence of the supremum norm $\epsilon_n(m) = sup_{1} \leq i \leq n, 1 \leq j \leq m \left| yi;j - \sqrt{n}o_{i,j} \right|$ and we find a coupling that improves by a factor of 2 the recently proved best known upper bound of $\epsilon_n(m)$. We will also discuss applications of our result to Quantum Information Theory.

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