

Stein's method and the multivariate CLT for traces of powers on the classical compact groups

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Let M_n be a random element of the unitary, special orthogonal, or unitary symplectic groups, distributed according to Haar measure. By a classical result of Diaconis and Shahshahani, for large matrix size n , the vector $(\text{Tr}(M_n), \text{Tr}(M_n^2), \dots, \text{Tr}(M_n^d))$ tends to a vector of independent, (real or complex) Gaussian random variables. Recently, Jason Fulman has demonstrated that for a single power j (which may grow with n), a speed of convergence result may be obtained via Stein's method of exchangeable pairs. In this talk, I will discuss a multivariate version of Fulman's result, which is based on joint work with Christian Döbler (Bochum).