On the separability probability of rank-deficient two qubit and qubit-qutrit states

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We are planning on presenting numerical analysis of separability probability of the rank-deficient random states of qubit-qubit and qubit-qutrit pairs from the so-called Hilbert-Schmidt ensemble. With this aim two methods of generation of a random low rank states of finite-dimensional quantum systems will be formulated and applied to the separability problem. First, we describe a direct method of generation of ensemble of random density matrices exploiting the conditional probability density function. Since this method becomes very cumbersome for composite systems larger than a pair of qubits, we elaborate an alternative method of generation. The latter is based on the recently obtained representation for the distribution functions of eigenvalues of density matrices of the rank-deficient states belonging to the boundary of state space in the form of a special Wishart-Laguerre distribution.

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