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On generation of random ensembles of mixed states for quantum bipartite systems

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Two methods of generation of random ensembles of mixed quantum states of different ranks are discussed. The first method exploits the Ginibre ensemble of complex square random matrices, while the second one is based on the singular value decomposition of density matrices. Distribution properties of the "probability of entanglement"in composite systems consisting from qubit-qubit and qubit-qutrit pairs are studied using both approaches to generate random Hilbert-Schmidt and Bures ensembles of quantum states of all possible ranks.

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