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Asymptotic convergence rates for statistical moments of pseudorandom quantum circuits WINTON BROWN, LORENZA VIOLA, Dartmouth College — We investigate the statistical moments of pseudorandom quantum circuits acting on an n-qubit system. We show that for pseudorandom quantum circuits that are invariant under arbitrary permutations of the qubit labels, there exists a representation of the linear map which describes the evolution of moments of fixed order, t, such that the dimension of the map scales polynomially in the number of qubits. The long time asymptotic convergence rate for low-order moments may be obtained by means of a perturbation expansion, shedding light on the question of how well pseudorandom quantum circuits approximate unitary t-designs.

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