

Tensors of free variables and random quantum channels

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We study tensor products of free random variables and establish a corresponding central limit theorem. This framework appears naturally as the limiting behavior of some random matrix models associated with quantum channels having random Kraus operators. We study the limiting spectral distribution of those random quantum channels and provide an estimate on the extreme eigenvalues. In particular, those estimates imply that many generic random constructions of quantum channels produce quantum expanders. Based on joint works with Cécilia Lancien and Patrick Oliveira Santos.

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