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*Random matrix models in quantum information theory*

We study random matrix models inspired by quantum information theory. Our main tool is a graphical calculus based on a diagrammatic notation for tensors, inspired by ideas of Penrose and Coecke. We introduce Wick and Weingarten calculus in our formalism and we describe a method for computing expectation values of diagrams which contain Gaussian or unitary, Haar-distributed random matrices. This is done by the means of a graph-expansion of diagrams. The graphical computations are intuitive and give insight on the dominating terms via combinatorics on permutations and non-crossing partitions. Finally, applications of these results to additivity conjectures are discussed.

This is joint work with Benoit Collins (University of Ottawa).