

Asymptotic conditional freeness of random matrices

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Voiculescu's freeness emerges in computing the asymptotic of randomly rotated $N \times N$ random matrices with respect to the normalized trace tr_N . In this talk, we will explain a recent extension of this result : considering a vector state $\varphi^{v_N} : M \mapsto \langle Mv_N, v_N \rangle$ for a sequence of deterministic vectors $v_N \in \mathbb{C}^N$, the asymptotic behavior of randomly rotated random matrices with respect to φ^{v_N} can be computed thanks to *conditional freeness* as defined by Bożejko and Speicher. More precisely, if the matrices are randomly rotated by uniform unitary matrices leaving invariant v_N , they become asymptotically conditionally free with respect to (tr_N, φ^{v_N}) as $N \rightarrow \infty$. In particular, it enlightens the (already known) location of the outlier eigenvalues in deformations of unitarily invariant ensembles.

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Références

- [1] Cébron, Dahlqvist and Gabriel, *Freeness of type B and conditional freeness for random matrices*, arXiv :2205.01926, 2022.
- [2] Cébron, Gilliers, *Asymptotic cyclic-conditional freeness of random matrices*, 2207.06249, 2022.