

---

**JAMES MINGO**, Queen's University

*Infinitesimal Freeness*

A universal rule for computing mixed moments of independent and unitarily invariant random matrices gives, in the large  $N$  limit, the rule for free independence. In the forty years since Voiculescu gave this rule many extensions and generalizations have been found.

One extension, found by Belinschi and Shlyakhtenko, is called infinitesimal freeness. This has been shown to model the case where the random matrices have different scales, however there are cases where the model doesn't cover some standard examples, in particular the Gaussian orthogonal ensemble. Guillaume Cébron and I have found the extension of infinitesimal freeness to the case of orthogonal invariance. In addition to covering the orthogonal case, real infinitesimal freeness also turns out to be the model of freeness needed for the subleading term of finite freeness, which has recently been found by Arizmandi, Perales, and Vázquez Becerra.