

Eigenvector Correlations in Quaternionic Ginibre Ensembles

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Introduction

As is widely known, non-Hermitian matrices feature distinct left and right eigenvectors, neither of which forms an orthonormal system. It was suggested by Chalker and Mehlig to study the correlation of these eigenvectors through the expectation values of their overlaps, and they demonstrated an approach via Schur decomposition for complex Ginibre ensembles.[1] Moreover, recent contributions for real and complex Ginibre ensembles have been made by Fyodorov,[2] and Bourgade and Dubach.[3] A newly published pre-print by Dubach treats the quaternionic case as well.[4]

We explore eigenvector correlations for matrices with quaternion Gaussian entries following Chalker's and Mehlig's idea. This allows us to derive expectations for finite N of both diagonal and off-diagonal overlaps, and to motivate heuristically their asymptotic behaviour,