RMT Thesis

RMT Group

1 Abstract

Voiculescu's monumental work on free probability in the 90's has provided framework to analyze complex interaction between non-commutative random variables. Building on to this foundation, the recent works of Mai and Speicher provides the theory of Analytic Subordination builds which provides a closed form formula of any polynomial combination of known RMT Ensembles, under the assumption that the ensembles are asymptitically. Nonetheless, the theory fails to explain limiting blip behaviors of special ensenbles, such as the k-checkerboard or DFT ensembles, and requires a strong condition of asymptotic freeness. In this paper, we drop the condition of asymptotical freeness and analyze the anticommutator product of matricies with linked and constant structure. In specific, we discuss the spectral densities of anticommutator products of two checkerboard matricies and linked Gaussian Ensenbles. We provide closed form formulas for the blip behavior for the former, and equivalencies between geometric and algebraic links for the latter.