哈爾濱工業大學 数学研究院
Institute for Advanced Study in Mathematics of HIT

Functional Analysis Seminar

The Brown measure of the sum of a free random variable and an elliptic deformation of Voiculescu's circular element

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Abstract

The circular element is the most important example of non-normal random variable used in free probability, and its Brown measure is the uniform measure in the unit disk. The circular element has connection to asymptotics of non-normal random matrices with i.i.d. entries. We obtain a formula for the Brown measure of the addition x_0+c of an arbitrary free random variable x_0 and circular element c, which is known to be the limit empirical spectral distribution of deformed i.i.d. random matrices.

Generalizing the case of circular and semi-circular elements, we also consider g, a family of elliptic deformations of c, that is $*$-free from x_0. Possible degeneracy then prevents a direct calculation of the Brown measure of x_0+g. We instead show that the whole family of Brown measures of operators x_0+g are the push-forward measures of the Brown measure of x_0+c under a family of self-maps of the complex plane, which could possibly be singular. The main results offer potential applications to various deformed random matrix models. This work generalizes earlier results of Bordenave-Caputo-Chafai, Hall-Ho, and a joint work with Ho.

Time: Wednesday, June 22, 2022, 19:30-21:00 (UTC+8)

Zoom ID: 824 7045 6491 (Password: 123399)

Link: https://zoom.us/j/82470456491?pwd=dGswU3d3RGd1L1d4a3ZvSXdnakVkUT09

More information on the Functional Analysis Seminar:
http://im.hit.edu.cn/en/2022/0414/c8931a271838/page.htm