LIMIT THEOREMS FOR RANDOM WALKS ON NON-COMPACT GRASSMANNIANS WITH GROWING DIMENSIONS

MERDAN ARTYKOV

We study some central limit theorems for invariant random walks on non-compact Grassmannian $SU(p,q)/S(U(p) \times U(q))$ over the fileds $\mathbb{R}, \mathbb{C}$, and the quaternions $\mathbb{H}$ with rank q and dimension parameter p. For $p > q$ these random walks can be identified can be identified with some Markov processes $(S_n^p)_{n \geq 0}$ on the Weyl chambers

$$C_q^B := \{x = (x_1, ..., x_q) \in \mathbb{R}^q : x_1 \geq ... \geq x_q \geq 0\}.$$

These Markov processes appear also in the context of certain Calogero-Moser- Sutherland particle models systems living on C_q^B. These models also have interpretations in the theory of random matrices and associated diffusions are projections of Brownian motions on the symmetric spaces G/K w with rank q where K is compact subgroup of Lie group G.

We present CLT's for fixed parameter p for $n \to \infty$ as well as CLT's for $n, p \to \infty$ coupled in a certain way. The proofs are based on spherical Fourier analysis and associated spherical characteristic functions are given by the Hekman-Opdam hypergeometric functions.