Topological hypergroups generalize in many ways the structure of topological groups. Several hypergroup structures are defined without an initial algebraic operation defined on the base space. Ultraspherical hypergroups are one of the hypergroup structures directly connected to a group structure. Naturally, several group properties can be generalized to an ultraspherical hypergroup. In this paper, the authors successfully simulate the characterization of a discrete topological group to characterize discrete ultraspherical hypergroups. The main results come from an investigation of the algebraic properties of $A(H)$, the Fourier algebra of $H$, and $VN(H)$, the von Neumann Algebra of $H$. These results are direct consequences of the study of weakly compact multipliers of $A(H)$, proving that an ultraspherical hypergroup $H$ is discrete if and only if there is a weakly compact right (equivalently left) multiplier $T \in VN(H)^*$ and $m \in VN(H)^*$ such that $T(m) \in A(H)$ and $\langle T(m), \lambda(\dot{e}) \rangle \neq 0$ when $\lambda$ denotes the left regular representation of $H$ on $L^2(H)$.

Reviewer: Norbert Youmbi (Loretto)

MSC:
43A62 Harmonic analysis on hypergroups
43A22 Homomorphisms and multipliers of function spaces on groups, semigroups, etc.

Keywords:
ultraspherical hypergroups; weakly compact multiplier

Full Text: DOI