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Gelfand Pairs and Corwin-Greenleaf Multiplicity Function

Let (K, N) be a nilpotent Gelfand pair and let $G := K \ltimes N$ be the semidirect product associated with (K, N). Let $\pi \in \widehat{G}$ be a generic representation of G and let $\tau \in \widehat{K}$. The Kirillov-Lipsman's orbit method suggests that the multiplicity $m_\pi(\tau)$ of an irreducible K-module τ occurring in the restriction of $\pi|_K$ can be linked to (the number of K-orbits) the Corwin-Greenleaf multiplicity function (C.G.M.F for short). Under some assumptions on the pair (K, N), in this work we focus on the connection between the geometric number C.G.M.F and the multiplicity $(m_\pi(.))$. In the geometric counterpart we give a necessary and sufficient conditions associated with the C.G.M.F. Moreover, we prove that this function is bounded for a special class of subgroups of G.

Keywords: Gelfand pairs, orbit method, Corwin-Greenleaf multiplicity function, branching laws.

MSC: 22D10, 22E27, 22E45.