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Smooth and Weak Synthesis of the Anti-Diagonal in Fourier Algebras of Lie Groups

Let G be a Lie group of dimension n , and let $A(G)$ be the Fourier algebra of G . We show that the anti-diagonal $\check{\Delta}_G = \{(g, g^{-1}) \in G \times G \mid g \in G\}$ is both a set of local smooth synthesis and a set of local weak synthesis of degree at most $\lfloor \frac{n}{2} \rfloor + 1$ for $A(G \times G)$. We achieve this by using the concept of the cone property of J. Ludwig and L. Turowska [Growth and smooth spectral synthesis in the Fourier algebras of Lie groups, *Studia Math.* 176 (2006) 139–158]. For compact G , we give an alternative approach to demonstrate the preceding results by applying the ideas developed by B. E. Forrest, E. Samei and N. Spronk [Convolutions on compact groups and Fourier algebras of coset spaces, *Studia Math.* to appear; arXiv:0705.4277]. We also present similar results for sets of the form HK , where both H and K are subgroups of $G \times G \times G \times G$ of diagonal forms. Our results very much depend on both the geometric and the algebraic structure of these sets.

Keywords: Locally compact groups, Lie groups, Fourier algebras, smooth synthesis, weak synthesis.

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