

Abstract

In this thesis, we investigate a range of structural and functorial properties of the *Orlicz Figà-Talamanca Herz algebra* $A_\Phi(G)$ and its dual space $PM_\Psi(G)$, associated with a *complementary pair of Young functions* (Φ, Ψ) satisfying the Δ_2 -condition.

We characterize the finite-dimensionality and reflexivity of the Banach algebra $A_\Phi(G)$ in terms of the underlying *locally compact group* G . We further examine the relationship between the Arens regularity of $A_\Phi(G)$ and the topological structure of G . In addition, we provide a criterion for the Arens regularity of $A_\Phi(G)$ formulated in terms of the spaces $PM_\Psi(G)$ and $PF_\Psi(G)$, where $PF_\Psi(G)$ denotes the algebra of Ψ -pseudofunctions. The Arens regularity of $PF_\Psi(G)$ is also studied in the setting of compact groups.

We then characterize the maximal regular left/right/two-sided ideals, as well as the minimal left ideals, of the algebras \mathcal{A}^* (equipped with the Arens product) and \mathcal{B}^{**} , where \mathcal{A} denotes a norm closed topologically introverted subspace of $PM_\Psi(G)$ and \mathcal{B} denotes either $B_\Phi(G)$, the multiplier algebra of $A_\Phi(G)$, or $W_\Phi(G)$, the dual space of $PF_\Psi(G)$.

We investigate the relationship between certain topologically invariant subspaces or subalgebras of the *algebra of Ψ -pseudomeasures* $PM_\Psi(G)$ and the underlying group G . In this context, we obtain sufficient conditions for the amenability of G in terms of norm closed topologically invariant subspaces of $PM_\Psi(G)$. Moreover, under the assumption that Φ satisfies the MA condition, we establish a bijective correspondence between certain topologically invariant subalgebras of $PM_\Psi(G)$ and the closed subgroups of an amenable group G . An analogous result is also obtained for the predual $A_\Phi(G)$ in terms of compact subgroups of a locally compact group G .

We also study the topological center problem for both the algebra $\mathcal{A} = A_\Phi(G)$ and the associated space $\mathcal{A}^*\mathcal{A} = UCB_\Psi(\widehat{G})$. For an amenable group G , we show that the problem of determining the strong Arens irregularity of $A_\Phi(G)$ reduces to the case of open σ -compact subgroups. A similar reduction result is established for the topological center of the Banach algebra $UCB_\Psi(\widehat{G})^*$, equipped with the Arens product.

Finally, we investigate the isomorphism problem for the Ψ -convolution algebras $PM_\Psi(G)$ and $PF_\Psi(G)$, determining the extent to which the topological properties of the group G are reflected in these associated algebras. We conclude by proving an Orlicz analogue of Parrott's isomorphism theorem, thereby extending aspects of harmonic analysis to the Orlicz-space setting.