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# ABSTRACTS OF AUSTRALASIAN PHD THESES

## BANACH SPACES OF PSEUDOMEASURES ON COMPACT GROUPS WITH EMPHASIS ON HOMOGENEOUS SPACES

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Segal algebras and homogeneous Banach algebras, which are generalizations of the group algebra $L^1(G)$ of a compact, or locally compact abelian group $G$, have been studied in Reiter [4], [5], [6], Burnham [1], [2], [3]; and Wang [7].

In Chapter 3 of this thesis a generalized notion of homogeneous Banach space over a compact group is considered. No multiplication is assumed. *If* B *denotes such a space then an operator* $*$ *may be defined from* $M(G) \times B$ to B so that it corresponds to the convolution product in familiar cases. Then

$$\lim_{n\to\infty} \|k_n * b - b\|_B = 0$$

for any $b \in B$ and any approximate identity $(k_n)_{n\in N}$ of $L^1(G)$. In fact this property is characteristic of homogeneous Banach spaces amongst those which are translation invariant. It is the basic tool used to study homogeneous Banach spaces.

Chapters 4 and 5 consider, in detail, the family $\mathcal{B}_h$ of homogeneous Banach spaces of pseudomeasures defined on a compact group. In Chapter 4 the elements B of $\mathcal{B}_h$ are characterized by means of norms defined on a family of trigonometric polynomials, and also by certain subspaces of

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$\underline{\underline{E}}(\Sigma(G))$ which are identified with $B^*$. If $B$ is also a subspace of $M(G)$ then it is a homogeneous convolution algebra; these algebras are the subject of Chapter 5.

A complete description of the homogeneous subalgebras of $L^1(G)$ is easily given. It is proved that the closed two-sided and closed left ideal theory of a homogeneous convolution Banach algebra $B$ is precisely the same as that of one of the homogeneous subalgebras of $L^1(G)$. Moreover, an explicit representation of the ideals is given. One is also given for the $*$-representations of any symmetric $B$ - again the picture is similar to that of one of the symmetric homogeneous subalgebras of $L^1(G)$.

The seemingly disjoint second chapter considers a problem concerning weighted subspaces of some pointwise algebras of integrable functions defined on a compact abelian group $G$. This problem leads to the study of the tensor algebras $C(G)_{F_1} \hat{\otimes} C(G)_{F_2}$, where $G$ is now a compact group and $F_1$, $F_2$ are subsets of $\Sigma(G)$. These algebras are homogeneous convolution Banach algebras in $B_h$.

## References

[1] J.T. Burnham, "Closed ideals in subalgebras of Banach algebras. I", *Proc. Amer. Math. Soc.* 32 (1972), 551-555.

[2] J.T. Burnham, "Closed ideals in subalgebras of Banach algebras II: Ditkin's condition", *Monash. Math.* 78 (1974), 1-3.

[3] James T. Burnham, "Segal algebras and dense ideals in Banach algebras", *Functional analysis and its applications*, 33-58 (International Conference, Madras, 1973. Lecture Notes in Mathematics, 399. Springer-Verlag, Berlin, Heidelberg, New York, 1974).

[4] H. Reiter, "Subalgebras of $L^1(G)$", *Nederl. Akad. Wetensch. Proc. Ser. A* 68 (1965), 691-696.

[5] H.J. Reiter, *Classical harmonic analysis and locally compact groups* (Oxford University Press, Oxford, 1968).

[6] H.J. Reiter, *$L^1$-algebra and Segal algebra* (Lecture Notes in Mathematics, 231. Springer-Verlag, Berlin, Heidelberg, New York, 1971).

[7] H.C. Wang, *Homogeneous Banach algebras* (Marcel Dekker, New York, 1977).

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