BULL. AUSTRAL. MATH. SOC. 43A15, 43A20, 43A25, 43A46
VOL. 22 (1980), 155-157.

ABSTRACTS OF AUSTRALASIAN PHD THESES

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

JOSEPHINE A. WARD (NEÉ GOODALL)

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 B_h of homogeneous Banach spaces of pseudomeasures defined on a compact group. In Chapter 4 the elements B of B_h are characterized by means of norms defined on a family of trigonometric polynomials, and also by certain subspaces of

---

Received 15 April 1980. Thesis submitted to the Australian National University, Canberra, November 1979. Degree approved: April 1980. Supervisor: Professor R.E. Edwards.

https://doi.org/10.1017/S0004972700006432 Published online by Cambridge University Press

$\underline{\underline{E}}(\Sigma(G))$ 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).