

*One-day Seminar on Functional Analysis,
February 8, 2007, IPM, Tehran*

C^* -crossed Product with Group-like Structures

M. Amini

*Tarbiat Modares University
Tehran, Iran*

Crossed product of a topological group and a C^* -algebra is well-studied. Here we survey recent developments of C^* -crossed products with other algebraic structures, such as (inverse) semigroups, groupoids, and hypergroups. Some motivating examples are presented.

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Banach Function Algebras

H. Garth Dales
University of Leeds
Leeds, UK

We consider Banach algebras of functions on a compact space X . A uniform algebra is a closed subalgebra A of the Banach algebra $C(X)$ of all continuous functions on X . We first consider structural properties that force A to be equal to $C(X)$. In particular we think when A has a dense set of invertible elements.

Next we take X to be a compact plane set and consider $D^{(1)}(X)$, the function algebra of continuously differentiable functions on X . It is not easy to decide just when this normed algebra is complete. We shall give some partial results.

The above is from joint work with Joel Feinstein.

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Reversed Automatic Continuity Operators Determining Topology

K. Jarosz

*Southern Illinois University
Illinois, USA*

Assume $M(A)$ be is a family of continuous operators on a Banach space A . Is the original topology of A the only complete norm topology making all the operators from A continuous?

We provide partial answers to that question for multipliers and other operators; in particular we prove that for a compact abelian group G and a circle group T

- for $A = L^p(T)$, $1 < p < \infty$, the original norm is the only one that makes all translations continuous,
- for $A = C(G)$, $L^\infty(G)$, $L^1(G)$, there are other norms with this property

For noncompact groups the situation is different - on space $L^1(R)$ the L^1 -norm is the only one that makes a single translation continuous.

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Recent Results and Open Problems in Topological Algebras

W. Zelazko

*Academy of Sciences
Warsaw, Poland*

1. Basic classes of topological algebras and some of their properties,
2. Ideals in F-algebras (complete metric algebras).
3. Topologically invertible elements.
4. Further open problems (many open problems will be discussed in 1-3).