

HARMONIC AND SPECTRAL ANALYSIS

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From almost invariant subspaces to group covering

EKATERINA SHULMAN

Vologda State University, Russia
Silesian University in Katowice, Poland

The theory of multivariable addition theorems of Levi-Civita's type on semigroups is related to the study of finite-dimensional subspaces that are "almost translation invariant". It leads to some general problems on subadditive mappings.

Given a semigroup G and a set Ω we call a map $F : G \mapsto 2^\Omega$ *subadditive* if

$$F(gh) \subset F(g) \cup F(h) \quad \text{for all } g, h \in G. \quad (1)$$

We are interested in the following question: *suppose that each $F(g)$ contains $\leq n$ elements, does it imply that all $F(g)$ are contained in a finite set? If yes, what can one say about its cardinality?*

In the talk we are going to consider reformulations of such problems into the language of group covering. In particular, the following result will be discussed.

For any covering $G = G_1 \cup G_2 \dots \cup G_k$ of a group G by its proper subgroups, there is an element of G that is covered by fewer than $k/2$ of these subgroups.