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ON TOPOLOGICAL GROUPS WITH A FIRST-COUNTABLE REMAINDER

A. V. ARHANGEL'SKII AND J. VAN MILL

Abstract. We establish the following estimate on the character of an arbitrary non-locally compact topological group with a first-countable remainder: it does not exceed ω_1. We also show that this estimate is the best possible by constructing a non-metrizable non-locally compact topological group with a first-countable remainder. At the beginning of the article, a brief survey of the properties of remainders of topological groups is provided.

1. Introduction

By *space*, we understand a Tychonoff topological space. By *remainder* of a space X, we mean the subspace $bX \setminus X$ of a Hausdorff compactification bX of X. We follow the terminology and notation in [7].

Recall that a *π-network (π-base)* of a space X at a point $x \in X$ is a family η of non-empty subsets (open subsets, respectively) of X such that every open neighbourhood of x contains a member of η.

A space is said to be *ω-bounded* (*strongly ω-bounded*) if the closure of every countable (σ-compact, respectively) subset is compact.

A series of results on remainders of topological groups have been obtained in [1], [2], and [4]. They show that the remainders of topological groups are much more sensitive to the properties of topological groups than the remainders of topological spaces are in general. Of course, there is an important exception to this rule: the case of locally compact topological groups. Indeed, every locally compact non-compact topological

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