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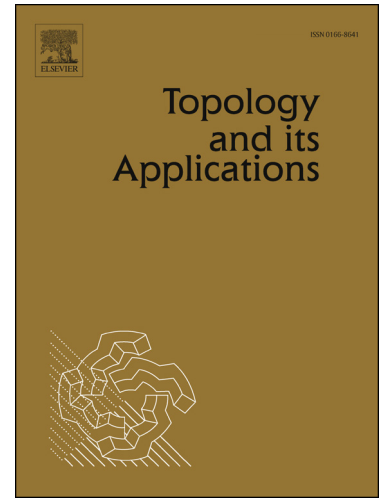
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Three-space properties in paratopological groups

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Abstract

We show that neither first-countable nor second-countable are three-space properties in the class of paratopological groups: we present a countable regular paratopological Abelian group H which contains a closed discrete subgroup F such that H/F is topologically isomorphic to the rational numbers with the Sorgenfrey topology and H is not first-countable. Also, we prove that if H is an invariant topological subgroup of a paratopological group G such that H is second-countable and G/H has countable network, then G has countable network as well (this answers a question posed in [12]). Hence if H is an invariant topological subgroup of a first-countable paratopological group G such that H and G/H are second-countable, then so is G .

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Keywords: Three-space property; Paratopological group; First-countable; Second-countable; Countable network

1 Introduction

A (*semitopological*) *paratopological group* G is a group G with a topology which make multiplication in G (separately) continuous. If, in addition, the inversion in G is continuous, the group G is

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