A special class of semi(quasi)topological groups and three-space properties. (English)


In the paper, paratopological, semitopological and quasitopological groups with sequential continuous multiplication are studied.

Sequential continuity is not defined explicitly in the paper.

In Section 3, relations are studied between different topological properties of semitopological groups with sequentially continuous multiplication. In particular, an example is constructed of a pseudocompact quasitopological group which is not a topological group. It is proved that a sequential quasitopological group with sequentially continuous multiplication contains a closed copy of the sequential fan $S_\omega$ if and only if it contains a closed copy of the Arens space $S_2$ (Theorem 4). An example is constructed under $(MA+\neg CH)$ of a nonmetrizable, separable, normal, Moore quasitopological group.

In Section 5 is proved that first-countability and second-countability are not preserved by extensions in the class of quasitopological groups. Pseudocompactness is not preserved by products of quasitopological groups in contrast with topological groups (see [W. W. Comfort and K. A. Ross, Pac. J. Math. 16, 483–496 (1966; Zbl 0214.28502)].

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MSC:

22A05 Structure of general topological groups
54A25 Cardinality properties (cardinal functions and inequalities, discrete subsets)
54E25 Semimetric spaces
54E30 Moore spaces
54E35 Metric spaces, metrizability
54G20 Counterexamples in general topology
54H11 Topological groups (topological aspects)

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Moore space; quasitopological group; semitopological group; sequentially continuous; three-space property

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