

Topological bisimple inverse semigroups

Kateryna Pavlyk
Tartu University, Estonia
Coauthors: Iryna Fihel

pavlyk@ut.ee

Abstract

The structure of all bisimple ω -semigroups, i.e. bisimple semigroups whose idempotents form a countable descending chain, was completely described by mean of Bruck-Reilly extension of a group. The bicyclic monoid \mathcal{C} is a Bruck-Reilly extension of the trivial group. By \mathbb{Z} -bicyclic semigroup $\mathcal{C}_{\mathbb{Z}}$ (resp., \mathbb{Z} -Bruck-Reilly extension of semigroup) we call the continuous version of the bicyclic monoid (resp., Bruck-Reilly extension of semigroup) defined on the Cartesian product $\mathbb{Z} \times \mathbb{Z}$ with the analogous semigroup operation.

The existence of topological structures on the bicyclic monoid \mathcal{C} compatible with monoid operation was investigated in the 60ies of the XX century. We introduce topological \mathbb{Z} -Bruck-Reilly and a topological \mathbb{Z} -Bruck extensions of (semi)topological monoids which are generalizations of topological Bruck-Reilly and a topological Bruck extensions of (semi)topological monoids and study their topologizations. The sufficient conditions under which the topological \mathbb{Z} -Bruck-Reilly (\mathbb{Z} -Bruck) extension admits only the direct sum topology and conditions under which the direct sum topology can be coarsened are given. Also, topological characterizations of some classes of I -bisimple (semi)topological semigroups is given.

AMS Classification: 22A15, 20M20.