

Abstract

The PHD thesis "Minimal transformations on continua" consists of three articles. In this cycle of papers we consider the following main problems.

1. An extension of the existing classification of compact metric minimal spaces for actions of the group of the integers and the semigroup of the nonnegative integers.
2. The long standing open problem whether the circle is a unique nondegenerate continuum which admits minimal continuous transformations and do not admit minimal continuous non-invertible transformations.
3. An existence and a construction of minimal non-invertible transformations on continua admitting minimal homeomorphisms.

The problem of an extension is partially solved by two different methods. The first one is a direct construction of minimal spaces. We define a class of compact metric spaces (called Slovak spaces) such that each space has at least three elements and its group of homeomorphisms is generated by a minimal homeomorphism. We prove, by construction, that such spaces exist. The second one is by proving that some class of spaces contains only spaces which do not admit minimal maps. We use this method to show that continua with three composants do not admit minimal transformations. We also use this method to show that hereditarily indecomposable continua, for which certain parameter is finite, do not admit minimal maps.

The second problem is solved negatively. Examples of Slovak spaces we construct do not admit minimal non-invertible transformations.

The third problem is solved for solenoids. We apply small perturbations to minimal homeomorphisms of solenoids and obtain minimal non-invertible transformations of solenoids. We also consider this problem for hereditarily indecomposable continua. We simplify construction developed by Kolyada, Snoha and Trofimchuk. We apply the simplified construction to a pseudo-circle. By doing so, we reduce the problem of existence of minimal non-invertible transformations on a pseudo-circle to the problem of the existence of minimal homeomorphisms which shrink some pseudo-arcs.