Jerzy DYDAK

Rips complexes and covers in the uniform category

Abstract: Berestovskii and Plaut introduced a theory of covers for uniform spaces generalizing their work for topological groups. The class of uniform spaces for which their theory works well are so-called coverable spaces. In their approach composition of covers may not be a cover and it is difficult to determine if a particular compact space is coverable. Part of the problem is that they generalize only regular covers in topology and those may not be preserved by compositions. In this paper we introduce covers for uniform spaces by expanding the concept of generalized paths of Krasinkiewicz and Minc. We use paths in Rips complexes and their homotopy classes possess a natural uniform structure. Applying Rips complexes leads to a natural class of uniform spaces for which our theory of covers works as well as the classical one, namely the class of uniformly joinable spaces. In the case of metric continua (compact and connected metric spaces) that class is identical with pointed 1-movable spaces, a well-understood class of spaces introduced by shape theorists. The class of pointed 1-movable continua contains all planar subcontinua (examples: Hawaiian Earring and the suspension of the Cantor set) and is preserved by continuous maps. The most notable continuum not being pointed 1-movable is the dyadic solenoid. As an application of our results we present an exposition of Prajs' homogeneous curve that is path-connected but not locally connected. (Joint work with: N. Brodskiy, B. Labuz, A. Mitra)