Simplicial Inverse Systems and Extension Theory

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Abstract. An inverse system is called *simplicial* if all its coordinate spaces are triangulated polyhedra and all its bonding maps are simplicial with respect to these triangulations. It has been shown by S. Mardešić that if a compact metrizable space X has $\dim X \geq 1$, and X is the inverse limit of a simplicial inverse sequence of compact triangulated polyhedra, then X must contain an arc. It follows then that a pseudo-arc cannot be the limit of such an inverse sequence. The first author has studied simplicial inverse systems, and we shall report on some outcomes of that research.

The motivation for studying simplicial inverse systems derives from joint research of L. Rubin and V. Tonić which is still in its preliminary stages. In extension theory, it is typically valuable to be able to represent a given metrizable compactum as the limit of a simplicial inverse sequence of compact triangulated polyhedra. But, as noted above, this is not always possible. Our program involves finding a "suitable replacement" Z for a given metrizable compactum X in such a manner that all the extension theoretic properties of X exist for Z. This means that if a given CW-complex is an absolute extensor for X, then it is also an absolute extensor for Z. Our plan is to find such a Z that is the limit of a simplicial inverse sequence of compact triangulated polyhedra and such that X is the cell-like image of Z under a map that is induced by the inverse sequence representing Z.

Joint work with Vera Tonić, University of Rijeka.