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Detecting codimension one manifold factors with general position properties

Abstract. A classical problem in topology is the characterization of spaces that are manifolds. Associated with this problem is the characterization of spaces that are manifold factors. A space X is said to be a codimension k manifold factor if $X \times \mathbb{R}^k$ is a manifold. It is well known that all finite dimensional resolvable generalized manifolds are codimension two manifold factors. To date, it is unknown whether or not all finite dimensional resolvable generalized manifolds are codimension one manifold factors. There are many examples of non-manifold spaces that are known to be codimension one manifold factors, including Bing's Dogbone space, totally wild flows, and certain ghastly spaces arising from constructions techniques first developed by Daverman and Walsh.

General position properties have been particularly useful in characterizing manifolds and manifold factors. In the mid 1970's, Edwards proved a conjecture of Cannon's that the n-manifolds, for $n \geq 5$, are precisely the finite dimensional resolvable generalized manifolds with the disjoint disks property. Likewise, there are several general position properties, which when satisfied by a finite dimensional resolvable generalized manifold X, are known to imply that $X \times \mathbb{R}$ has the disjoint homotopies property. In this presentation, I will discuss several general position properties which detect codimension one manifold factors and their utility in applications. Such properties include the disjoint arc-disk property, disjoint homotopies property, the plentiful 2-manifolds property, the method of δ-fractured maps, the disjoint concordances property, and the 0-stitched disks property.