Shape of minimal sets in aperiodic flows

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Abstract: In 1950, H. Seifert asked whether every non-singular $\mathbb{R}$-action (flow) on the 3-sphere has a periodic trajectory. The conjecture that the answer is yes became known as the Seifert Conjecture. Seifert proved the conjecture for perturbations of the flow parallel to the Hopf fibration. The Modified Seifert Conjecture asserted the existence of a minimal set of topological dimension ≤ 1. Since a C^1 counterexample to the Seifert Conjecture given P. A. Schweitzer in 1974, many other examples of aperiodic flows on $\mathbb{S}^3$ appeared in the literature, all of which are based on a construction of a plug with peculiar minimal sets. We are interested in the algebraic properties of the minimal sets from the point of view of Borsuk's Shape Theory and Vietoris-Čech Homology. In particular, we will concentrate on one-dimensional minimal sets obtained by the method of self-insertion.