

# Non-hyperbolic singularities and periodic orbits: what can be learned from the topological-dynamical approach?

Non-hyperbolic singularities and periodic orbits are two phenomena that may display extremely complex dynamical behaviour, even in the case of smooth flows. Moreover, “analytic” methods may entirely fail to deal with them. We will discuss what can be learned, in such cases, from the topological-dynamical approach, and propose a classification theorem for the behaviour of flows near arbitrary compact invariant sets. This result also enables an interesting insight into the topological-dynamical structure of the set of all compact minimal sets of the flow.

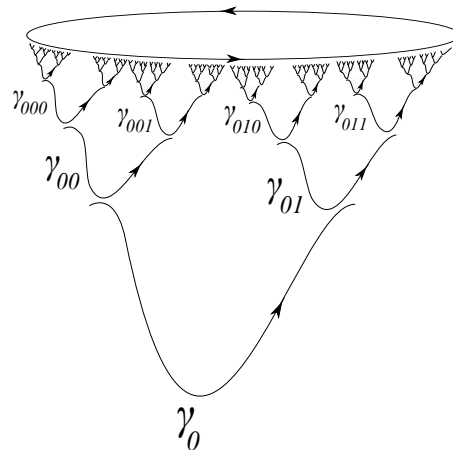


Fig. 1: Periodic orbit *tree* displaying a continuum of sequences of *orbits of infinite height*. Smooth flows exhibiting this strange phenomenon already occur in dimension 4.