Topology and dynamics of non-saddle sets

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The theory of non-saddle sets can be considered as a general theory of stability and attraction, extending the classical one and encompassing recent developments such as the theory of unstable attractors without external explosions. The authors have previously studied some topological properties of non-saddle sets and their region of influence. In this talk we present three new results, the first of which establishes an exact sequence relating the cohomology of a global non-saddle set of a flow on a manifold to the cohomology of the manifold. The second one similarly establishes an exact sequence for the non-saddle decompositions of flows in manifolds and the third studies some bifurcation properties of non-saddle sets of flows in the plane. These results have been obtained in collaboration with Hector Barge and Jaime Sánchez-Gabites.