

GLOBAL BIFURCATIONS OF 3D DIFFEOMORPHISMS WITH NON-ROUGH HOMOCLINIC AND HETEROCLINIC TRAJECTORIES

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Global bifurcations leading to appearance of stable periodic orbits, invariant tori and strange attractors in multi-dimensional dynamical systems are studied. These problems attract high interest provided by recent discovery of strange attractors of a new type: wild hyperbolic attractors. This kind of strange attractor, unlike well-known Lorenz attractor and hyperbolic attractor allows homoclinic tangencies inside it but, of course, as a true strange attractor does not contain stable periodic orbits. Another important property of such attractors is that they can be met in applications and models. The examples are: spiral attractor in the Turaev-Shil'nikov model, attractors obtained as periodic perturbations of Lorenz-like systems etc. But when observing an attractor in application, it is hard (or even impossible when using numerical methods only) to distinguish true strange attractor from a quasiattractor (which can contain stable orbits).

Some cases related to this problem are considered. Namely, bifurcations of homoclinic tangencies to saddle and saddle-focus fixed points of a neutral type are investigated. It is shown that these cases are principally different. Explanation of the "invisibility effect" of stable periodic orbits in one-parametric families is provided.

Regarding the heteroclinic bifurcations, a contracting-expanding case of a contour consisting of two saddle-foci is investigated. It is shown that there may co-exist an infinite number of wild hyperbolic Lorenz-like attractors.