

Weak hyperbolic structures and robust properties of diffeomorphisms and flows.

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A dynamical property is called robust if it holds on a (non-empty) open set of diffeomorphisms or flows. This means that it is impossible to break the property by small perturbations. It is therefore natural that robust properties are strongly related with structure limiting the effect of small perturbations.

Thus:

- the structural stability of the limit set is equivalent to the hyperbolicity of the chain recurrent set (Robbin 71 Robinson 76/ Mané 88 Palis 88)
- the singular hyperbolicity is a necessary condition for robust singular attractor for flows on 3-manifolds (Morales Pacifico Pujals 98)
- partial hyperbolicity (resp. volume partial hyperbolicity) is needed for robust transitivity of diffeomorphisms on 3-manifolds (Diaz Pujals Ures 99) (resp. in higher dimensions (Bonatti Diaz Pujals 2003))
- stable ergodicity is dense among conservative partially hyperbolic systems with 1-dimensional center bundle (2004 / 2008).

In this talk, I will present old and recent results illustrating the relation hyperbolic structure/robust phenomena.