GLOBAL ATTRACTORS OF FLOWS, CONLEY INDEX AND SHAPE

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In this talk some results concerning topological aspects of continuous parametrized families of dissipative flows are presented. Dissipative flows are those which have a global attractor (see [6]). This attractor continues to a family of attractors that are not global in general. We present a necessary and sufficient condition to ensure that the global attractor continues to a global attractor and we show, using this result, that the global attractor of the Lorenz system continues to a global attractor. We also study the bifurcation global to non-global using shape theory and the Conley index theory.

References

- H. Barge, J.M.R. Sanjurjo, Dissipative flows, global attractors and shape theory, Topology Appl. 258 (2019), 392–401.
- H. Barge, J.M.R. Sanjurjo, A Conley index study of the evolution of the Lorenz strange set, Phys. D (2019), 132162, https://doi.org/10.1016/j.physd.2019.132162.
- [3] A. Giraldo, M.A. Morón, F.R. Ruiz del Portal, J.M.R. Sanjurjo Shape of global attractors in topological spaces, Nonlinear Anal. 60 (2005), 837–847.
- [4] L. Kapitanski, I. Rodnianski, Shape and Morse theory of attractors, Commun. Pure and Appl. Math. 53 (2000), 218–242.
- [5] N. Levinson Transformation theory of non-linear differential equations of the second order, Ann. Math. 45 (1944), 723-737.
- [6] V.A., Pliss, Nonlocal Problems of the Theory of Oscillations, Academic Press, New York, 1966.
- [7] R.W. Robbin, D. Salamon, Dynamical systems, shape theory and the Conley index, Ergod. Theory Dyn. Syst. 8* (1988), 375–393.
- [8] J.C. Robinson, Global attractors: topology and finite-dimensional dynamics, J. Dyn. Differ. Equ. 11 (1999), 557–581.
- [9] J.M.R. Sanjurjo, Morse equations and unstable manifolds of isolated invariant sets, Nonlinearity 16 (2003), 1435–1448.
- [10] J.M.R. Sanjurjo, Global topological properties of the Hopf bifurcation, J. Differential Equations243 (2007), 238–255.
- [11] C. Sparrow, The Lorenz Equations: Bifurcations, Chaos and Strange Attractors, Springer, Berlin, 1982.