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Dynamical Complexity in the Rössler system

Consider the Rössler equations, as a typical example of a smooth flow with a chaotic attractor in $\mathbb{R}^3$. As was found in many numerical studies, the dynamics generated by the Rössler equations can be described by those of the logistic family. In this talk, I will address the question of proving analytically this connection between the Rössler equations and the one-dimensional logistic family.

Namely, I will show that by assuming the system admits a certain type of a heteroclinic connection at some parameter values (as found in numerical studies), we can verify existence of infinitely many periodic orbits and characterize their topologies - without assuming any hyperbolicity condition on the dynamics of the flow. Time permitting, we will extend these ideas by proving that in a sufficiently small neighbourhood of such parameters, the return map for the flow is at least as complicated as the logistic family in a specific sense I will define.