

A topological approach to the Lorenz equations

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Resumo/Abstract:

We propose a new way to look at the classical Lorenz equations. In a groundbreaking paper in 2006 Étienne Ghys proved that the set of periodic orbits of the Lorenz system coincides with the set of periodic orbits of the geodesic flow on the modular surface. We will show that the Lorenz equations can naturally be defined on the complement of the trefoil knot in S^3 and thus they share the same underlying topological space with the modular flow. Furthermore, we will show that the flows themselves can be shown to be orbit equivalent, thus essentially the Lorenz equations are hyperbolic.