



I seminari del Dipartimento di Matematica e Informatica

Mercoledì 28 aprile, ore 16

Aula Multimediale del Dipartimento di Matematica e Informatica:

“The mystery of chaos in the Lorenz equations”

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Abstract

The Lorenz system still fascinates many people because of the simplicity of the equations that generate such complicated dynamics on the famous butterfly attractor. This talk addresses the role of the stable and unstable manifolds in organising the dynamics more globally. A main object of interest is the stable manifold of the origin of the Lorenz system, also known as the Lorenz manifold. This two-dimensional manifold and associated manifolds of saddle periodic orbits can be computed accurately with numerical methods based on the continuation of orbit segments, defined as solutions of suitable boundary value problems. This allows us to study bifurcations of global manifolds as the Rayleigh parameter is changed. We show how the entire phase space of the Lorenz system is organised and changes dramatically during the transition to chaotic dynamics. The fascination of the Lorenz system goes far beyond mathematics and as a bonus you will see how the Lorenz manifold was turned into a steel sculpture.

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