

Title:

Periodic orbits inside a tentacular geometry

Abstract:

In this study, we carry out some novel research on a one-parameter family of four-dimensional reversible Hamiltonian vector fields with a bifocal equilibrium point. The folding patterns of the two-dimensional invariant manifolds in phase space, which are explained by the existence of homoclinic orbits, give rise to intricate formations, called tentacular geometry in literature. We enhance the understanding of the evolution of tentacular geometry with respect to the parameter by exploring the intersections of the invariant manifolds with a cross-section invariant under the reversibility map. This new approach enables us to conjecture the existence of cascades of homoclinic tangencies that accumulate in a saddle-node periodic orbit.