

Generation of hidden multiscroll attractors based on piecewise linear systems

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Abstract: In this work, we present an approach to generate a hidden multiscroll attractor by defining a vector field on \mathbb{R}^3 with an even number of equilibria. The vector field is defined by affine linear systems such that each equilibrium point is a saddle point. So the space is partitioned in hyperbolic set. We start by generating a self-excited multiscroll attractor based on heteroclinic orbits. Interesting phenomena appear when the equilibria are separated by pairs, firstly, the system presents only one basin of attraction which is divided accordingly with the separation of the equilibria, and the coexistence of different self-excited double-scroll attractors arise. At a certain separation of equilibria a hidden multiscroll attractors emerges. In this process of separation of equilibria, the resulting basin of attraction presents a widening.

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