Dynamics Of A Generalized Model By Gerhard Keller

Zhaoyang Dong

Departament de Matemàtiques, Edifici Cc, Universitat Autònoma de Barcelona, 08913 Cerdanyola del Vallès, Barcelona, Spain

E-mail address: `dong@mat.uab.cat`

We consider family of quasiperiodically forced dynamical systems given by the map

$$F(\theta, x) = (\theta + \omega \mod(1), \lambda f(x + a) \cdot g(\theta)), \tag{1}$$

where $\theta + \omega$ is an irrational rotation on the unit circle, $g(\theta) \geq 0$ is continuous on the circle. The forced function $f : \mathbb{R} \to \mathbb{R}$ preserves those basic characteristics of Keller's one in [2], and λ is used as a parameter of this family.

Such a family is a generalized model given by Gerhard Keller in [2]. By this model Keller proved successfully the existence and the properties of *Strange Nonchaotic Attractors*, which introduced in the paper [1]. Such attractors are nonchaotic attracting invariant graphs (of functions) with strange geometry and which attract almost every orbit in the space.

The purpose of our study is to get a more completed perspective on the relation of the phenomena of strange nonchaotic attractors and such type of models, so it may help us to understand the creation mechanism of the strange nonchaotic attractors. Here we give the description of the entire dynamics of our models, that is, the asymptotic properties of their orbits, the topological properties of their attractors, and their changes according to the variation of parameters.

References

[1] C. Grebogi, E. Ott, S. Pelikan, and J. A. Yorke. Strange attractors that are not chaotic. *Phys. D*, **13** (1984), 261–268.

[2] G. Keller. A note on strange nonchaotic attractors. *Fund. Math.*, **151** (1996), 139–148.