Skew-product maps with base having closed set of periodic points

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Resumen

Our frame of working will be discrete dynamical systems induced by *skew-product maps* defined on the unit square $I^2 = [0,1] \times [0,1]$, i.e., continuous transformations from I^2 into itself of the form $F : (x, y) \to (f(x), g(x, y))$. The maps f and g are respectively called the *base* and the *fiber* map of F. These type of systems are the mathematical environment for modelling some biological, economical and engineering processes, thus the study of their dynamics is a important problem ([2]).

The aim of this communication is to present a example of a skew-product map with base having closed set of periodic points holding the following property:

$$\Omega(G) \neq \overline{\bigcup_{x \in \mathrm{P}(g)} \{x\} \times \Omega(G^{p_x}|_{I_x})}, \tag{1}$$

where $\mathrm{P}(\cdot)$ and $\Omega(\cdot)$ represent respectively the set of periodic and nonwandering points.

This result disprove a theorem from Efrenova [1] and has some nontrivial implications, for instance, it forces the non equivalence between the properties

- $\mathrm{P}(F)$ is closed,
- $\mathrm{P}(F) = \Omega(F)$.

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Referencias

[1] L. S. Efremova, *On the nonwandering set and the center of triangular maps with closed set of periodic points in the base*, Dynamical Systems and Nonlinear Phenomena, Inst. Math. NAS Ukraine, Kiev, 1990, 15 – 25 (in Russian).

[2] S.F. Kolyada. *On Dynamics of Triangular Maps of the Square*, Ergodic Theory and Dynamical Systems. **12** (1992) 749–768.