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Zgliczynski, Piotr, Jagiellonian University, Cracow, Poland

Sharkovskii theorem for multidimensional perturbations of 1-dim maps

Let us denote by $\triangleleft$ the Sharkovskii ordering of positive integers. Let $f : \mathbb{R} \to \mathbb{R}$ be a continuous map, let $V = \mathbb{R} \oplus W$ be Banach space, and let $F : [0,1] \times V \to V$ be a continuous and compact map, such that $F_0(x,w) = (f(x), 0)$, where $x \in \mathbb{R}, w \in W$.

Suppose f has a point of period n. Then for every $r > 0$ there exists $\lambda_0 > 0$ such that for $\lambda \leq \lambda_0$ holds: if $n \triangleleft m$, $m \neq n$ then F_λ has a periodic point of period m in the set $\mathbb{R} \oplus B_W(r)$, where $B_W(r)$ is an open ball in $W$of radius r.

Reference: P. Zgliczynski, Sharkovskii theorem for multidimensional perturbations of 1-dim maps, *Erg. Th. & Dyn. Sys.* , accepted