



# Sharkovskii order for non-wandering points

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For a map  $f: I \rightarrow I$ , a point  $x \in I$  is periodic with period  $p \in \mathbb{N}$  if  $f^p(x) = x$  and  $f^j(x) \neq x$  for all  $0 < j < p$ . When  $f$  is continuous and  $I$  is an interval, a theorem due to Sharkovskii ([cite{BC}](#)) states that there is an order in  $\mathbb{N}$ , say  $\text{Shd}$ , such that, if  $f$  has a periodic point of period  $p$  and  $p \text{Shd} q$ , then  $f$  also has a periodic point of period  $q$ . In this work, we will see how an extension of this order  $\text{Shd}$  to an ultrapower of the integer numbers yields a Sharkovskii-type result for non-wandering points of  $f$ .

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