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The Extension of Sarkovskii's Results and the Topological Entropy in Unimodal Transformations

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Introduction

The study of chaos is very important not only from a mathematical but also from a physical and biological point of view. One parameter family of continuous maps, from interval to itself, is an especially important example and recently the study of them has made great progress.

In this article we will examine unimodal transformations. Our aim is to extend Sarkovskii's result ([6], [7]) and to calculate the topological entropy of the transformations. A continuous map from interval $I=[a, b]$ $(-\infty<a<b<\infty)$ to itself will be called unimodal if there exists a unique point $c\in(a, b)$ such that

i) $f(c)>f(x)$ for any $x\in[a, b]$ $x\neq c$

ii) f is monotone increasing in $[a, c]$

and

iii) f is monotone decreasing in $[c, b]$.

Here we only treat those maps which satisfy

i) $I=[0, 1]$

ii) $f(1)=0$

iii) $f(c)=1$

and

iv) $0<f(0)<1$.

In general, all unimodal transformations except some trivial ones can be reduced to this case. If f is linear in both $[a, c]$ and $[c, b]$, f is called a unimodal linear transformation. Concerning unimodal linear transformations, see [1].

§1. Notations and preliminaries.

Let Θ be an aggregate of all the formal symbols

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