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Markov Partitions and Feigenbaum-like Mappings

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Abstract: We construct a Markov partition for a Feigenbaum-like mapping. We prove that this Markov partition has bounded nearby geometry property similar to that for a geometrically finite one-dimensional mappings [8]. Using this property, we give a simple proof that any two Feigenbaum-like mappings are topologically conjugate and the conjugacy is quasisymmetric.

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0. Introduction

Markov process has been introduced by Sinai and Bowen, etc. in the study of dynamical systems in the 1960's. Sinai [16] and Bowen [2] constructed a Markov partition for a hyperbolic dynamical system. Using Markov partitions, they related hyperbolic dynamical systems with symbolic dynamical systems. Thus hyperbolic dynamical systems can be studied topologically through symbolic dynamical systems rather easily. Indeed, to construct a Markov partition for a dynamical system is quite important in the study of dynamical systems. In this note, I shall give a construction of a partition for a Feigenbaum-like mapping. I shall prove that this partition has all but finiteness properties as those of a Markov partition for a hyperbolic dynamical system. It will be called an (infinite) induced Markov partition. A Feigenbaum-like mapping is definitely not hyperbolic for its critical orbit is recurrent. However, from the construction and properties of this induced Markov partition, one can study topologically and geometrically a Feigenbaum-like mapping

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