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ON EVENTUAL COLORING NUMBERS

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Abstract. In [6], for each natural number p we defined eventual colorings within p of homeomorphisms which are generalizations of colorings of fixed-point free homeomorphisms, and we investigated the eventual coloring number $C(f,p)$ of a fixed-point free homeomorphism $f : X \to X$ with zero-dimensional set of periodic points. In [6], we constructed two indices $\varphi_n(k)$ and $\tau_n(k)$ for evaluating the eventual coloring number $C(f,p)$. The purpose of this paper is to construct a new index $\psi_n(k)$ which is more appropriate than the indices $\varphi_n(k)$ and $\tau_n(k)$.

1. Introduction

In this paper, we assume that all spaces are separable metric spaces and all maps are continuous functions. Let $\mathbb{N}$ be the set of all natural numbers, i.e., $\mathbb{N} = \{1, 2, 3, ...\}$. For a separable metric space X, $\dim X$ denotes the covering dimension of X. For each map $f : X \to X$, let $P(f)$ be the set of all periodic points of f, i.e.,

$$P(f) = \{x \in X|\ f^j(x) = x \text{ for some } j \in \mathbb{N}\}.$$

For a subset K of X, $\mathrm{cl}(K)$, $\mathrm{int}(K)$ and $\mathrm{bd}(K)$ denote the closure, interior and the boundary of K in X, respectively. Let $\mathcal{C}$ be a family of subsets of X. For each $x \in X$, $\mathrm{ord}_x(\mathcal{C})$ denotes the number of elements of $\mathcal{C}$ which contain x, i.e.,

$$\mathrm{ord}_x(\mathcal{C}) = |\{C \in \mathcal{C} \mid x \in C\}|.$$

By a *swelling* of a family $\{A_s\}_{s \in S}$ of subsets of a space X, we mean any family $\{B_s\}_{s \in S}$ of subsets of X such that $A_s \subset B_s$ $(s \in S)$ and for every

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