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Topological Classification of Knaster Continua with Finitely Many Endpoints

In this work we develop a symbolic dynamics method which enables us to study properties of certain classes of inverse limits. We first consider the family of Knaster continua $K_s = \varprojlim\{[0,1], f_s\}$, where $f_s\colon [0,1] \to [0,1]$ are tent functions with slope $s \in [\sqrt{2}, 2]$ and periodic extreme points. Continua of this family are represented as quotient spaces of two-sided admissible sequences of zeros and ones, with respect to a suitable equivalence relation. We are interested in the structure of the composant of the endpoint $\bar{c}$ related to the kneading sequence of f_s. We define p-i-points characterized by the equivalence relation on the quotient space, and p-bridges, i.e. specially chosen arcs connecting certain p-i-points. We show that the first $(p-1)$-bridge in the structure of every p-bridge is of the same type as the first bridge at an arbitrary level which contains the endpoint $\bar{c}$. We also show that if there exist two homeomorphic continua in the class we study, then there exists a mapping $h_{q,p}$ between composants of the endpoints and there exists an $r \in \mathbb{N}$, $r \geq p$, for which the mapping $h_{q,p}$ maps the first bridge at level $q+1$ onto the first bridge at level r. From this fact we conclude that the kneading sequences of the corresponding tent functions are equal. In other words, for tent functions f_s and f_t, $s, t \in [\sqrt{2}, 2]$, with periodic extreme points, if $s \neq t$, than the continua K_s and K_t are not homeomorphic.

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