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APOSYNDETIC PROPERTIES OF UNICOHERENT CONTINUA

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In the first part of this paper the structure of n-aposyndetic continua is studied. In particular, those continua which are n-aposyndetic but fail to be $(n+1)$-aposyndetic are investigated. Unicoherence is shown to be a sufficient condition for an n-aposyndetic continuum to be $(n+1)$-aposyndetic. In the final portion of the paper a stronger form of unicoherence is defined. As a point-wise property, aposyndesis and connected im kleinen are shown to be equivalent in continua with this property.

Throughout this paper a *continuum* is a compact connected metric space and M will denote a continuum. If N is a subcontinuum of M, the interior of N in M will be denoted by int N. Suppose $p \in M$ and F is a closed subset of M such that $p \notin F$. *M is aposyndetic at p with respect to F* if there is a subcontinuum N of M such that $p \in \operatorname{int} N \subset N \subset M - F$. Let n be a positive integer. If M is aposyndetic at p with respect to each subset of M consisting of n points, then M is *n-aposyndetic at p*. M is *n-aposyndetic* if it is n-aposyndetic at each point. By convention if M is 1-aposyndetic then M is said to be aposyndetic.

For other terms not defined herein, see [3], [4] and [6].

LEMMA 1. *Suppose M is n-aposyndetic, $p \in M$, F is a subset of $M - \{p\}$ consisting of $n+1$ points, and M is not aposyndetic at p with respect to F. If F_1 and F_2 are disjoint nonempty subsets of F such that $F = F_1 \cup F_2$, there exist subcontinua H and K such that $F_1 \subset H - K$, $F_2 \subset K - H$, $p \in \operatorname{int}(H \cap K)$, and $M = H \cup K$.*

Proof. Suppose F_1 and F_2 are disjoint nonempty subsets of F and $F = F_1 \cup F_2$. For each $x \in F_1$ there is a subcontinuum N_x in $M - (F - \{x\})$ such that $p \in \operatorname{int} N_x$. Clearly $x \in N_x$. Let $A = \bigcup \{N_x: x \in F_1\}$. For each $x \in F_1$ there is a subcontinuum L_x such that $x \in \operatorname{int} L_x$ and $L_x \cap F_2 = \emptyset$. Let $A_1 = A \cup (\cup \{L_x: x \in F_1\})$. Then A_1 is a continuum, $\{p\} \cup F_1 \subset \operatorname{int} A_1$, and $A_1 \cap F_2 = \emptyset$.

Now by interchanging the roles of F_1 and F_2 we obtain a continuum A_2 such that $\{p\} \cup F_2 \subset \operatorname{int} A_2$ and $A_2 \cap F_1 = \emptyset$.

Let $V = (M - A_1) \cap \operatorname{int} A_2$ and $U = (M - A_2) \cap \operatorname{int} A_1$. Let H be the component of $M - V$ which contains A_1 and let K be the component of $M - U$ which contains A_2. Then $F_1 \subset H - K$, $F_2 \subset K - H$,