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A NOTE ON SEPARATION AXIOMS AND THEIR APPLICATION IN THE THEORY OF A LOCALLY CONNECTED TOPOLOGICAL SPACE

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In a recent paper [1][1] G. E. Albert and the author attempt a comprehensive study of a locally connected (1.8) topological space from the point of view of Peano space theory [2]. Cyclic elements are defined (2.15) and are themselves found to be locally connected and topological (2.29). Moreover, it is shown that under proper and very natural topologization (3.3) the class of all cyclic elements (the hyperspace) becomes a locally connected topological space (3.3 and 3.8). In fact, this hyperspace has no nondegenerate[2] cyclic elements (3.17).

For the purposes of this note it is the concept of a hereditary class of spaces which is important (4.1). A subclass $\mathcal{H}$ of the class $\mathfrak{X}$ of all locally connected topological spaces is hereditary if, whenever X is a space of the class $\mathcal{H}$: (1) each true cyclic element (2.15) of X is a member of $\mathcal{H}$; and (2) the hyperspace X_h is in $\mathcal{H}$. (It should be remembered that the first condition is the one required of a class for it to be cyclicly reducible in the classical Peano space theory.)

The problem is to define small hereditary classes (4.1). In fact, though there is a smallest hereditary class, an intrinsic definition of it is lacking (4.2–4.5).

In this connection the main results are that: (1) the class of all locally connected T_0-spaces is a hereditary class (4.10); (2) the class of all locally connected T_1-spaces is *not* a hereditary class (4.1).

It is the purpose of this note: (1) to define, by means of a separation axiom, a new hereditary class; (2) to place this separation axiom

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[1] Numbers in brackets refer to the bibliography; numbers in parentheses to appropriate paragraphs in [1].

[2] A set is degenerate if it is vacuous or contains but a single point.