

Straightenable continua and the stretch topology

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A metric ϱ on a continuum X is *straightening* if it makes the subcontinuum betweenness relation “look straight” in the following sense: given points $a, b, c, d \in X$ such that every subcontinuum containing a, b also contains c, d , we have $\varrho(c, d) \leq \varrho(a, b)$. A continuum is *straightenable* if it has a generating metric that is also straightening.

The notion of straightenability is easily seen to be a topological invariant; in fact Every metrizable continuum has a uniquely-defined *stretch topology* that refines the continuum topology in general, and which coincides with the continuum topology precisely when the continuum is straightenable. Locally connected (indeed, aposyndetic) continua are straightenable, and straightenable continua are decomposable (indeed, they’re Wilder continua). None of these implications are reversible, so straightenability properly interpolates between aposyndesis and being Wilder.

Stretch topologies for nondegenerate continua are never discrete; they possess uncountably many pairwise disjoint clopen subsets when the continuum is indecomposable; and they are zero-dimensional when the continuum is hereditarily indecomposable.

The notions of *straightenability* and *stretch topology* generalize to arbitrary (Hausdorff) continua through the use of uniformity bases, but this line of research is still in early stages.

The talk will stress possible lines of research on this topic; slides that include more detail will be provided on my Marquette website <https://www.mscsnet.mu.edu/~paul/talks.html>.

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