WHAT HAPPENS WHEN TWO INFINITESIMAL RELATIONS COINCIDE?

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Many interesting results in topology and functional analysis are closely related to situations in which two otherwise distinct topologies or uniformities coincide. In this paper, we consider a number of pairs of infinitesimal relations and examine the consequences of the condition that they coincide on certain subsets of the underlying space. One example leads to a new characterization of uniform spaces with invariant nonstandard hulls when the uniformity is generated by a single pseudometric. Other applications include external characterization of strong and weak compactness for subsets of Banach spaces and their duals.

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