

locally compact Hausdorff spaces*

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1 Locally compact Hausdorff spaces

Definition 1.1. A locally compact Hausdorff space H_{LC} is a locally compact topological space (X_{LC}, τ) with τ being a Hausdorff topology, that is, if given any distinct points $x, y \in X_{LC}$, there exist disjoint sets $U, V \in \tau$ such that, $U \cap V = \emptyset$ (that is, open sets), and with x and y satisfying the conditions that $x \in U$ and $y \in V$.

Remark 1.1. An important, related concept to the locally compact Hausdorff space is that of a *locally compact (topological) groupoid*, which is a major concept for realizing extended quantum symmetries in terms of *quantum groupoid representations* in: quantum algebraic topology (QAT), topological QFT (TQFT), algebraic QFT (AQFT), axiomatic QFT, QCG, and quantum gravity (QG). This has also prompted the relatively recent development of the concepts of homotopy 2-groupoid and **homotopy double groupoid** of a Hausdorff space [?, ?]. It would be interesting to have also axiomatic definitions of these two important algebraic topology concepts that are consistent with the T2 axiom.

References

- [1] K.A. Hardie, K.H. Kamps and R.W. Kieboom., A homotopy 2-groupoid of a Hausdorff space, *Applied Cat. Structures*, **8** (2000): 209-234.
- [2] R. Brown, K.A. Hardie, K.H. Kamps and T. Porter, A homotopy double groupoid of a Hausdorff space, *Theory and Applications of Categories* **10**,(2002): 71-93.

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