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Cartesian closed hull for (quasi-)metric spaces (revisited)

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Abstract: An existing description of the cartesian closed topological hull of $p\mathrm{MET}^\infty$, the category of extended pseudo-metric spaces and nonexpansive maps, is simplified, and as a result, this hull is shown to be a special instance of a "family" of cartesian closed topological subconstructs of $pqs\mathrm{MET}^\infty$, the category of extended pseudo-quasi-semi-metric spaces (also known as quasi-distance spaces) and nonexpansive maps. Furthermore, another special instance of this family yields the cartesian closed topological hull of $pq\mathrm{MET}^\infty$, the category of extended pseudo-quasi-metric spaces and nonexpansive maps (which has recently gained interest in theoretical computer science), and this hull is also shown to be a nice generalization of Prost, the category of preordered spaces and relation preserving maps.

Keywords: (extended) pseudo-(quasi-)metric space, (quasi-)distance space, preordered space, demi-(quasi-)metric space, cartesian closed topological, CCT hull
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