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Mapping Groupoids for Topological Orbifolds

We consider topological orbifolds as proper étale groupoids, i.e., topological groupoids with a proper diagonal and étale structure maps. We call these orbifold groupoids. To describe maps between these groupoids and 2-cells between them, we will use the bicategory of fractions of the 2-category of orbifold groupoids and continuous functors with respect to a subclass of the Morita equivalences which is suitably small and gives a bicategory of fractions that is equivalent to the usual one. We will present several nice results about the equivalence relation on the 2-cell diagrams in this bicategory that then enable us to obtain a very explicit description of the topological groupoids $\text{Map}(G, H)$ encoding the new generalized maps from G to H and equivalence classes of 2-cell diagrams between them. When G has a compact orbit space we show that the mapping groupoid is an orbifold groupoid and has the appropriate universal properties to be the mapping object. In particular, sheaves on this groupoid for the mapping topos for geometric morphisms between the toposes of sheaves on G and H . This construction is invariant under Morita equivalence: Morita equivalent copies of G and H result in a Morita equivalent mapping groupoid. This groupoid can also be viewed as a pseudo colimit of mapping groupoids in the original 2-category of topological groupoids and continuous functors.