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Orbifold Translation Groupoids

In [2], Moerdijk and the author showed that one should view the category of orbifolds as the bicategory of fractions of orbifold groupoids with respect to the class of essential equivalences. This implies that a morphism of orbifolds is of the form

$$\mathcal{G} \xleftarrow{w} \mathcal{K} \xrightarrow{f} \mathcal{H},$$

where w and f are morphisms of Lie groupoids and w is an essential equivalence. We call such a morphism a *generalized map*. An orbifold is called *representable* if it can be presented by a translation groupoid of a Lie group acting on a manifold. Representable orbifolds are of interest when one wants to apply notions from equivariant homotopy theory to orbifolds. A large class of orbifolds is representable, including all effective ones [1].

In this talk I will discuss the generalized maps between representable orbifolds. When $\mathcal{G}$ and $\mathcal{H}$ above are translation groupoids, it does not follow in general that $\mathcal{K}$ is also a translation groupoid. And even when $\mathcal{K}$ is a translation groupoid, it does not follow in general that w and f are equivariant morphisms. However, we will show that the full sub-bicategory of orbifold groupoids on translation groupoids is equivalent to the bicategory of fractions of translation groupoids and equivariant morphisms with respect to equivariant essential equivalences. Finally, we will give a precise description of equivariant essential equivalences.

This is joint work with Laura Scull, who will discuss applications of this result to equivariant homotopy theory for orbifolds.

References

[1] A. Henriques and D. Metzler, *Presentations of noneffective orbifolds*. Trans. Amer. Math. Soc. **356**(2004), 2481–2499.

[2] I. Moerdijk and D. A. Pronk, *Orbifolds, groupoids and sheaves*. K-theory **12**(1997), 3–21.