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Groupoid Models and C*-algebras of Diagrams of Groupoid Correspondences

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A groupoid correspondence is a generalised morphism between tale groupoids. Topological graphs, self-similarities of groups, or self-similar graphs are examples of this. Groupoid correspondences induce C*-correspondences between groupoid C*-algebras, which then give Cuntz-Pimsner algebras. The Cuntz-Pimsner algebra of a groupoid correspondence is isomorphic to a groupoid C*-algebra of an tale groupoid built from the groupoid correspondence. This gives a uniform construction of groupoid models for many interesting C*-algebras, such as graph C*-algebras of regular graphs, Nekrashevych's C*-algebras of self-similar groups and their generalisation by Exel and Pardo for self-similar graphs. If possible, I would also like to mention work in progress to extend this theorem to relative Cuntz-Pimsner algebras, which would then cover all topological graph C*-algebras.

Groupoid correspondences form a bicategory. This structure is already used to form the groupoid model of a groupoid correspondence. It also allows us to define actions of monoids or, more generally, of categories on groupoids by groupoid correspondences. Passing to C*-algebras, this gives a product system where the unit fibre is a groupoid C*-algebra. If the monoid is an Ore monoid, then the Cuntz-Pimsner algebra of this product system is again a groupoid C*-algebra of an tale groupoid, which is defined directly from the action by groupoid correspondences. For more general monoids, the two constructions become different, however. We show this in a special case that is related to separated graph C*-algebras and their tame versions.