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Groupoids associated to join inverse categories

Join inverse categories [1] are inverse categories that come with a way to glue together two partially defined morphisms, provided they agree everywhere that they are defined. To every inverse semigroup can be associated an inductive groupoid (Ehresmann-Schein-Nambooripad) and, by extension, to every inverse category $\mathbf{X}$ a top-heavy locally inductive groupoid $\mathcal{G}(\mathbf{X})$ [2].

This talk will show that the groupoids associated to join inverse categories share at least two interesting properties [3]:

1. Each admits a pair of functors

$$(-)_* : \mathcal{G}(\mathbf{X})^{\mathrm{op}} \to \mathbf{Loc} \text{ and } (-)^* : \mathcal{G}(\mathbf{X}) \to \mathbf{Loc}$$

   such that, for each arrow $(\alpha : A \to B) \in \mathcal{G}(\mathbf{X})$, the locale homomorphisms α_* and α^* form an equivalence of categories between A^* and B^* (locales considered as posetal categories).

2. Each admits an Ehresmann topology, a data structure very much analogous to a Grothendieck topology, but in the language of *covering order ideals*.

REFERENCES:

[1] J.R.B. Cockett, G.S.H. Cruttwell, and J.D. Gallagher. Differential restriction categories. *Theory and Applications of Categories*, 25(21):537-613, 2011.

[2] D. DeWolf and D. Pronk. The Ehresmann-Schein-Nambooripad Theorem for Inverse Categories. *arXiv*, Nov. 2017, 1507.08615v2.

[3] D. DeWolf. Restriction Category Perspectives of Partial Computation and Geometry. PhD thesis, Dalhousie University, 2017.