This document contains a list of short ideas of future research in Algebraic General Topology.

I have created branch `devel` in the LaTeXrepository for the book to add new "draft" features there. The `devel` branch isn't distributed by me in PDF format, but you can download and compile it yourself.

This research plan is not formal and may contain vague statements.

1. Things to do first

Which filter operations are congruences on equivalence of filters?

2. Misc

Some special cases of reloids: https://www.researchgate.net/publication/331776637_Functional_Boundedness_of_Balleans_Coarse_Versions_of_Compactness

"Unfixed" for more general settings than lattice and its sublattice. (However, it looks like this generalization has no practical applications.)

Should clearly denote $\mathsf{pFCD}(\mathfrak{A};\mathfrak{Z})$ or $\mathsf{pFCD}(\mathfrak{A})$.

https://en.wikipedia.org/wiki/Compact_element

https://arxiv.org/abs/1904.12525 On proximal fineness of topological groups in their right uniformity

https://arxiv.org/abs/1905.00513 On $\mathcal{B}$-Open Sets

Try to describe a filter with up of infintiely small components. For this use a filter (of sets or filters) rather than a set of sets.

About generalization of simplical sets for nearness spaces on posets? https://arxiv.org/abs/1902.07948

3. Category theory

Can product morphism (in a category with restricted identities) be considered as a categorical product in arrow category? (It seems impossible to define projections for arbitrary categories with binary product morphism. Can it be in the special cases of funcoids and reloids?)

Attempting to extend Tychonoff product from topologies to funcoids: —— If i has left adjoint: If r is left adjoint to i, we have $\operatorname{Hom}(A,i(X\times Y))=\operatorname{Hom}(r(A),X\times Y)=\operatorname{Hom}(r(A),X)\times\operatorname{Hom}(r(A),Y)=\operatorname{Hom}(A,i(X))\times\operatorname{Hom}(A,i(Y))$. —— If also the left adjoint is full and faithful: $\operatorname{Hom}(A,i(r(X)\times r(Y)))=\operatorname{Hom}(r(A),r(X)\times r(Y))=\operatorname{Hom}(r(A),r(X))\times\operatorname{Hom}(r(A),r(Y))=\operatorname{Hom}(A,X)\times\operatorname{Hom}(A,Y)$. See also http://math.stackexchange.com/q/1982931/4876. However this does not apply because reflection of topologies in funcoids is not full.

Being intersecting is defined for posets (= thin categories). It seems that this can be generalized for any categories. This way we can define (pointfree) funcoids between categories generalizing pointfree funcoids between posets. (However this is probably easily reducible to the case of posets.)

I have defined $\mathsf{RLD}\sharp$ to describe Hom-sets of the category or reloids but without source and destination and without composition. RLD should be replaced with $\mathsf{RLD}\sharp$ where possible, in order to make the theorems throughout the book a little more general. Also introduce similar features like $\Gamma\sharp$ and $\mathfrak{F}\Gamma\sharp$ (the last notation may need to be changed).

Misc properties of continuous functions between endofuncoids and endoreloids.