Section 4: Category Tools

Coequalizer

In a category window, selecting Tools | Coequalizer? opens a dialog window allowing the specification of a first and second paths, and then a path to be tested as a coequalizer of the two paths. The "Coequalizer object" checkbox may be checked allowing either selection of a possible coequalizer object from a drop-down list or the user may choose to check all objects. All paths to the object (or objects) will then be tested as coequalizers.

WARNING: The domain and codomain of the two paths must be the same. The codomain of the two paths must be the same as the domain of the coequalizer path. The test is only valid on a confluent category. (If in doubt use the Make Confluent tool).

Create A Product Of Categories

Selecting (in a Category window) Tools | Create Product opens a dialog which allows the user to create a product of categories; select another category from the drop-down list, and click "OK". This will open a new window containing the product category.

NOTE: To save the product category, select File | Save As.

Create A Sum Of Categories

Selecting (in a Category window) Tools | Create Sum opens a dialog which allows the user to create a sum of categories; select another category from the drop-down list, and click "OK". This will open a new window containing the sum category.

NOTE: To save the sum category, select File | Save As.

Epimorphism

In a category window, selecting Tools | Epimorphism? opens a dialog window allowing input of a path to check as an epimorphism. Additionally, the "Check all paths" checkbox may be selected to check all paths in the current category.

WARNING: The test is only valid on a confluent category. (If in doubt use the Make Confluent tool).

Equalizer

In a category window, selecting Tools | Equalizer? opens a dialog window allowing the specification of a first and second paths, and then a path to be tested as an equalizer of the two paths. The "Equalizer object" checkbox may be checked allowing either selection of a possible equalizer object from a drop-down list or the user may choose to check all objects. All paths from the object (or objects) will then be tested as equalizers.

WARNING: The domain and codomain of the two paths must be the same. The domain of the two paths must be the same as the codomain of the equalizer path. The test is only valid on a confluent category. (If in doubt use the Make Confluent tool).

Equality of Composites

To test two (composite) arrows for equality in the current category select (in a category window) Tools | Equality of Composites. A dialog allows entry of two paths.

WARNING: The category must be confluent for valid results. Domains and codomains of paths must match.

Initial Object

In a category window, select Tools | Initial Object?. This command tests objects of the current category (chosen by a dialog) for initiality. For each selected object which is not initial a reason is given.

WARNING: This command will not operate correctly unless the category has a confluent set of relations. If in doubt use Make Confluent tool first.

Isomorphism

In a category window, selecting Tools | Isomorphism? opens a dialog window allowing the input of up to non-identity two paths to be checked for isomorphism. Additionally, the "Check all paths" checkbox may be selected to check all paths of the current category.

WARNING: The test is only valid on a confluent category. (If in doubt use the Make Confluent tool).

Make Confluent

In a category window, select Tools | Make Confluent. This command applies the Knuth-Bendix algorithm to the currently displayed category with arrows ordered in their storage order. Relations which are added to the current category are reported. To add these relations to the current category click "Ok", or click "Cancel" to keep the category in its current form.

Make Dual

This tool will create the opposite category of the currently displayed category. In a category window, select Tools | Make Dual. A dialog window opens prompting for the name of the dual. After the user provides the name the dual category is displayed in a new window.

WARNING: The opposite category is NOT SAVED automatically when it is created; use (in the category window) File | Save if you wish to save the dual.

Monomorphism

In a category window, selecting Tools | Monomorphism? opens a dialog window allowing input of a path to check as a monomorphism. Additionally, the "Check all paths" checkbox may be selected to check all paths in the current category.

WARNING: The test is only valid on a confluent category. (If in doubt use the Make Confluent tool).

Partial Order

To test if a category is a partial order, select (in a category window) Tools | Partial Order.

WARNING: The category must be confluent for valid results.

Product

In a category window, selecting Tools | Product? opens a dialog window allowing selection of a possible product object from the current category from a drop-down and specification of (possibly composite) first and second projections, then testing the span for being a product. If `Check all objects' is selected, then enter two objects in order to check all spans to the two objects for being a product.

WARNING: The domain of each projection must be the putative product object. The test is only valid on a confluent category. (If in doubt use the Make Confluent tool).

Pullback

In a category window, selecting Tools | Pullback? opens a dialog window allowing selection of a possible pullback object from the current category from a drop-down and specification of (possibly composite) paths alpha and beta forming a cospan (and optionally projections), then testing for pullback(s).

WARNING: The test is only valid on a confluent category. (If in doubt use the Make Confluent tool).

Pushout

In a category window, selecting Tools | Pushout? opens a dialog window allowing selection of a possible pushout object from the current category from a drop-down and specification of (possibly composite) paths alpha and beta forming a span (and optionally co-projections), then testing for pushout(s).

WARNING: The test is only valid on a confluent category. (If in doubt use the Make Confluent tool).

Sum

In a category window, selecting Tools | Sum? opens a dialog window allowing selection of a possible sum object from the current category from a drop-down and specification of (possibly composite) first and second injections, then testing the cospan for being a sum. If `Check all objects' is selected, then enter two objects in order to check all cospans from the two objects for being a sum.

WARNING: The codomain of each injection must be the putative sum object. The test is only valid on a confluent category. (If in doubt use the Make Confluent tool).

Terminal Object

In a category window, select Tools | Terminal Object?. This command tests objects of the current category (chosen by a dialog) for being terminal. For each selected object which is not terminal a reason is given.

WARNING: This command will not operate correctly unless the category has a confluent set of relations. If in doubt use Make Confluent Tool first.