Merging of Path Generators

by Sven Nilsen, 2017

By interpreting paths as partial function products, it is possible to derive rules for merging path generators. In general for asymmetric path semantics[1], using Path Function Product Notation[2]:

$$f[g_{i\to n}][h_{i\to n}] <=> f[h_i \cdot g_i \to h_n \cdot g_n]$$

Here, `·` means function composition.

A short hand version can be written as:

$$f[g_{i\to n}][h_{i\to n}] <=> f[(h \cdot g)_{i\to n}]$$

This is easily convertible to symmetric form, by erasing index information.

Intuitively:

$$\because \quad g_{in} : A_{in} \to B_{in}$$
$$\because \quad h_{in} : B_{in} \to C_{in}$$

$$\therefore \quad (h \cdot g)_{in} : A_{in} \to C_{in}$$

Of course, this depends on whether both paths `f[$g_{i\to n}$]` and `f[$g_{i\to n}$][$h_{i\to n}$]` exists.

Merging of path generators corresponds to composition of the generators on partial function products.

References:

[1] “Algebraic Notation for Asymmetric Paths”
Sven Nilsen, 2017
https://github.com/advancedresearch/path_semantics/blob/master/papers-wip/algebraic-notation-for-asymmetric-paths.pdf

[2] “Path Function Product Notation”
Sven Nilsen, 2017-2019
https://github.com/advancedresearch/path_semantics/blob/master/papers-wip/path-function-product-notation.pdf