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oh no sequences! – Era7 bioinformatics

Dagger category theory

Dagger categories are the basis of categorical approaches to quantum mechanics [1], and are starting to see applications in fields such as reversible computing [2] or linguistics [3].

In this talk we show how by essentially doing formal category in a 2-category $\mathbf{Cat}_\dagger$ of dagger categories in the spirit of [5], we can give a more conceptual basis to standard constructions with dagger categories; yielding for example, a general definition of dagger-limit extending the somewhat ad-hoc definitions of dagger biproducts or dagger kernels proposed in the literature.

We end with some speculations related to a Yoneda structure on $\mathbf{Cat}_\dagger$, and what is the right setting for formal dagger category theory.

References:

[1] Samson Abramsky, Bob Coecke – Categorical quantum mechanics, Chapter in *Handbook of Quantum Logic and Quantum Structures* vol II (2008).

[2] William J. Bowman, Roshan P. James, Amr Sabry – Dagger Traced Symmetric Monoidal Categories and Reversible Programming, *RC2011* (2011).

[3] Chris Heunen, Mehrnoosh Sadrzadeh, Edward Grefenstette – Quantum Physics and Linguistics: A Compositional, Diagrammatic Discourse, *Oxford University Press* (2013).

[4] Chris Heunen, Bart Jacobs – Quantum logic in dagger-kernel categories, *Order* 27(2), (2010) p 177-212.

[5] Paul H. Palmquist – Monads defined by involution-preserving adjunctions, *Transactions of the American Mathematical Society* 213, (1975)