Bicategories of algebras for relative pseudomonads

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Abstract.

Relative pseudomonads, introduced in [1], extend the notion of pseudomonad to non-endofunctors. We introduce pseudoalgebras for relative pseudomonads (showing that these recover the no-iteration algebras defined in [2]), define the bicategory of pseudoalgebras associated to a relative pseudomonad T, and establish its universal property amongst resolutions of T. We show that the Kleisli bicategory for T (constructed in [1]) embeds into the bicategory of T-pseudoalgebras as the full sub-bicategory of free T-pseudoalgebras; this provides a general coherence theorem when the codomain of T is a 2-category. As an application, we establish that the pseudoalgebras for the presheaf construction are the locally-small categories admitting small colimits.

References

[1] M. Fiore, N. Gambino, M. Hyland and G. Winskel, *Relative pseudomonads, Kleisli bicategories, and substitution monoidal structures*, Selecta Mathematica 24 (2018), no. 3, 2791–2830.

[2] F. Marmolejo and R. J. Wood, *No-iteration pseudomonads*, Theory and Applications of Categories 28 (2013), 371–402