

Weights for oplax colimits

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Abstract.

In 2-categories one can consider a notion of colimit whose universal property is expressed in terms of oplax transformations, rather than 2-natural transformations. These are called *oplax colimits*. Examples include the coKleisli category of a comonad and the Grothendieck construction for functors into $\mathbf{Cat}$. By applying the theory of oplax-morphism classifiers for 2-monad algebras, one can express oplax colimits as ordinary weighted colimits of 2-categories for a particular class of weights. This class of weights bears similarities to the class of *PIE weights* — those generated by products, inserters and equifiers — such that some results and perspectives from the analysis of PIE weights in [1], [2] and [3] can be adapted to these “oplax weights”.

The talk will provide a summary of the work begun during my PhD with Richard Garner toward describing this class of oplax weights and some related sub-classes. This work includes a presentation of oplax weights as precisely the coalgebras for oplax-transformation classifiers on presheaf categories, as well as a characterisation of the discrete 2-fibrations which arise as categories of elements for these weights. We will also observe that the free completion of a 2-category under this class of colimits admits a rather natural description by a 2-category of “families”, containing the coKleisli completion as a sub-completion.

References

- [1] R. Blackwell, G. M. Kelly, and A. J. Power, *Two-dimensional monad theory*, J. Pure Appl. Algebra 59 (1989), no. 1, 1–41.
- [2] J. Power and E. Robinson, *A characterization of pie limits*, Math. Proc. Cambridge Philos. Soc. 110 (1991), no. 1, 33–47.
- [3] S. Lack and M. Shulman, *Enhanced 2-categories and limits for lax morphisms*, Adv. Math. 229 (2012), no. 1, 294–356.