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Strictification of models of generalized algebraic theories

Generalized algebraic theories, introduced by Cartmell in the late 1970s, extend the framework of Lawvere theories by allowing the introduction of dependent sorts. This feature makes such theories convenient, for example, for axiomatizing (1-categories of) higher categorical structures in a type-theoretic language. If T is a generalized algebraic theory, two different kinds of models of T have been traditionally considered: a strict one, where contexts are interpreted as iterated families of sets, and a categorical one, which is a model of the underlying finite-limit sketch (or clan) of the syntactic category C(T). These two versions often match, but not always.

We will discuss this phenomenon and indicate how it relates to a more general issue regarding generalized algebraic theories: they can be arranged into a 2-category, but the morphisms that preserve all available structure are too strict to directly encode the intended categorical semantics. This can be studied by constructing a Quillen model structure on the category of generalized algebraic theories whose homotopy bicategory correctly expresses the weaker semantics - that gives, in particular, a strictification result for models of cofibrant theories.