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Algebras and view updates

Database view updating can be seen as a lifting problem, so it is not surprising that fibrations arise. For $\mathbf{C}$ a category with products, and an object B, the sum functor $\mathbf{C}/B \longrightarrow \mathbf{C}$ is a left adjoint, and an algebra $(G\colon E \to B, P)$ for the generated monad on $\mathbf{C}/B$ has G essentially a projection (called a "lens" by Pierce).

When $\mathbf{C} = \mathbf{Cat}$ a lens $G\colon E \to B$ is an (op)fibration. On the other hand, taking the projection $(G, 1_B) \to B$ from the comma category is the functor part of a monad on $\mathbf{Cat}/B$. An algebra for $(-, 1_B)$ provides a good notion of a "partial lens". Furthermore, an opfibration has "universal translations". These provide a universal solution to the view updating problem when $G = W^*\colon \mathrm{Mod}(E) \to \mathrm{Mod}(V)$ for a view (sketch morphism) $W\colon V \to E$ in the Sketch Data Model.

We will also make remarks about how to interpret the lens notion in tensor categories.