Approximation as Differentiation notes

1 OVERVIEW

Some notes on the key constructions:

- Categories of families, special case of Grothendieck construction

2 DEFINITIONS

2.1 Category of families

For a functor $F : C \to Set$, we have the category where:

- objects are pairs (A, x) where $x \in FA$
- morphisms from (A, x) to (B, y) are morphisms $f : A \to B$ in C where $(Ff)(x) = y$

This is the Grothendieck construction for a functor $F : C \to \mathbf{Cat}$, in the special case where $F : C \to \mathbf{Set}$. (Where we read a **Set**-valued functor as a **Cat**-valued functor restricted to discrete categories.

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