A TYPE THEORY FOR COMPREHENSION CATEGORIES

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Recent models of intensional type theory have been constructed in algebraic weak factorization systems (AWFSs). AWFSs give rise to comprehension categories that feature non-trivial morphisms between types; these morphisms are not used in the standard interpretation of Martin-Löf type theory in comprehension categories.

We develop a type theory that internalizes morphisms between types, reflecting this semantic feature back into syntax. Our type theory comes with Π-, Σ-, and identity types. We discuss how it can be viewed as an extension of Martin-Löf type theory with coercive subtyping, as sketched by Coraglia and Emmenegger. We furthermore define semantic structure that interprets our type theory and prove a soundness result. Finally, we exhibit many examples of the semantic structure, yielding a plethora of interpretations.

The talk is based on a recently published paper [Naj+26].

References

[Naj+26] Niyousha Najmaei et al. "From Semantics to Syntax: A Type Theory for Comprehension Categories". In: *Proc. ACM Program. Lang.* 10.POPL (2026), pp. 2409–2438. DOI: 10.1145/3776725. URL: https://doi.org/10.1145/3776725.