Categories with dependent and codependent arrows

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We study categories with family and dependent arrows, introduced in [1], that grasp type-dependency in categorical terms. As arrows are categorical generalisations of functions, family arrows and dependent arrows are categorical generalisations of type families and dependent functions in Martin-Löf Type Theory, respectively. We explain how the Sigma-objects in the type-categories of Pitts [2] are affected by the presence of the second projections as dependent arrows. Categories with cofamily arrows and codependent arrows are defined in a dual way. We present the canonical cofamily and codependent structure of the category of small types.

References

[1] I. Petrakis: Categories with dependent arrows, arXiv:2303.14754v1, 2023.

[2] A. M. Pitts: Categorical logic, in S. Abramsky, D. M. Gabbay, T. S. E. Maibaum (Eds.) *Handbook of Logic in Computer Science*, Vol. 5, Clarendon Press, Oxford, 2000, 39–128.