

WEAK ADJOINT FUNCTOR THEOREMS

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The General Adjoint Functor Theorem of Freyd has a straightforward extension to the enriched setting. There is also a Weak Adjoint Functor Theorem, due to Kainen, and providing a sufficient condition for the existence of a weak left adjoint, where weakness refers to the existence but not uniqueness of factorizations.

I will report on recent joint work with John Bourke and Lukas Vokrinek, in which we prove a weak adjoint functor theorem in the enriched context. This actually contains the other three theorems as special cases. Our base for enrichment will be a monoidal model category.

Our motivating example involves simplicially enriched categories, where the base category of simplicial sets is equipped with the Joyal model structure. The theorem then has applications to the Riehl-Verity theory of infinity-cosmoi.