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On the decomposition of a strong epimorphism into regular epimorphisms

One of the most fundamental theorems in algebra is the fundamental theorem of homomorphisms, which states that $\text{Im}(f) \cong A/\text{Ker}(f)$ for any homomorphism $f: A \rightarrow B$. In categorical terms, this states that strong epimorphisms and regular epimorphisms are equivalent in categories of algebraic structures such as groups, rings, and so on. Although this equivalence fails in general, it is known that in any locally presentable category, every strong epimorphism can be decomposed into a transfinite composite of regular epimorphisms. In this talk, I will discuss how many regular epimorphisms are needed in such a decomposition, which measures the extent to which the fundamental theorem of homomorphisms holds for general algebra-like structures such as n -categories.

This talk is based on joint work with Yuto Kawase.

Yuto Kawase, Hayato Nasu. "On the decomposition of a strong epimorphism into regular epimorphisms." arXiv:2604.05744.