

Eugenia Cheng
School of the Art Institute of Chicago

Weak functors for degenerate Trimble 3-categories

One of the basic tests of validity for a theory of weak n -categories is that doubly degenerate 3-categories should be somehow equivalent to braided monoidal categories. This analysis is helped by the fact that braided monoidal categories are well understood but is typically hindered by the need to use weak functors of n -categories as part of the equivalence.

We will present a theory of weak functors that enables us to prove such an equivalence for Trimble's definition of n -category. We use the fact that Trimble's definition is monadic and the monad can be expressed via distributive laws, and we show how to decompose both the algebras and their weak maps via these distributive laws. We also formalise an abstract Eckmann-Hilton argument for such algebras to show both where the braiding eventually comes from and why the corresponding braided monoidal functors do not need extra data over monoidal functors, only an extra axiom. A biequivalence between the bicategory of braided monoidal categories and the bicategory of doubly degenerate Trimble 3-categories using these weak functors can then be proved.