

Ülo Reimaa
University of Tartu

Bicategories with lax units and Morita theory

We will examine a weakened version of a bicategory, where the unit laws are lax [3]. The main example of such lax-unital multiplication is the tensor product of modules over semigroup objects in a suitable monoidal category.

In the case of rings without an identity element, people have observed that it makes sense to consider classes of rings and modules on which the tensor product is better behaved in some sense [2], [4], mostly in the context of Morita theory. Similar things can be done for semigroups objects [1] in Set . We will look at lax-unital bicategories for which there exist analogous well-behaved subclasses and how they relate to the original lax-unital bicategory.

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