Strengthening of groupoid enrich linear theories

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Abstract

A groupoid enrich category is called theory if it posses finite weak coproducts. A result of Power asserts that such a theory is equivalent to one which posses finite coproducts. We will discuss the situation when theory is linear, meaning that it has zero object and finite weak coproducts are also finite weak product. It turns out that in general such an object is impossible to replace with equivalent one which posses both finite products and coproducts. We construct a cohomological obstruction for this problem. We also show that any such theory is equivalent to one which posses finite coproduct which is quadratic, meaning that the difference between coproduct and product of two objects is bilinear.