

## Split extensions of bialgebras

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### Abstract

In the category of groups, split extensions have a lot of interesting properties. One of them is the fact that the category of split extensions is equivalent to the category of group actions. Unfortunately, this does not hold in any category, for example the category of monoids does not have this property. Nevertheless, it was proved in [1,2], that there exists such an equivalence if the split extensions of monoids are « Schreier extensions ». In this talk, I will explain this construction of Schreier split extensions and their properties. Also motivated by a recent result on split extensions of unitary magmas [3], I will then consider split extensions in the category of (non-)associative bialgebras. Which conditions on the split extensions of bialgebras do we need to have an equivalence with the category of actions of bialgebras? This presentation, which is based on the preprint [4], will eventually answer this question.

[1] N. Martins-Ferreira, A. Montoli, M. Sobral, Semidirect products and crossed modules in monoids with operations, *J. Pure Appl. Algebra* vol. 217, 334-347, (2013). [2] D. Bourn, N. Martins-Ferreira, A. Montoli, M. Sobral, Schreier split epimorphisms in monoids and semirings, *Mathematics Texts Série B*, Department of Mathematics, University of Coimbra, vol. 45 (2014). [3] M. Gran, G. Janelidze and M. Sobral, Split extensions and semidirect products of unitary magmas, *Comment. Math. Univ. Carolin.*, vol. 60, no. 4, 509-52, (2019). [4] F. Sterck, Split extensions of bialgebras and Hopf algebras, <https://arxiv.org/abs/2008.02126> (2020).