Chase—Sweedler Galois theory in additive monoidal categories

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Abstract.

Chase—Sweedler theory of Galois objects [1] was originally developed at a purely categorical level, and in two special cases, where the ambient category $\mathcal{C}$ was: (a) the category of commutative (unital) R-algebras; (b) the category of cocommutative R-coalgebras (in both cases R is a commutative unital ring). We study the intermediate level of generality, where C is the category of monoids in an additive symmetric monoidal (=tensored) category, whose tensor product functor is additive in each argument. This is a work in progress, whose main goal is to describe the Harrison functor T in terms of Ext^1 functor, as it is done in [1] for commutative R-algebras. Here T is defined in terms of Galois objects, which are essentially the same as G-torsors for suitable internal (co)groups G in $\mathcal{C}$. Apart from that we explain how to extend various auxiliary and related constructions and results from the cases of algebras and coalgebras to our context. Note that many of them involve finitely generated projective objects, and their counterparts in our context are just cartesian factors of finite cartesian powers of the unit object of the ambient monoidal category.

References

[1] S. Chase, , M. Sweedler *Hopf algebras and Galois theory*, Lecture Notes in Math 97, Springer-Verlag, 1969.