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Adnan Abdulwahid and **Miodrag Iovanov*** (miodrag-iovanov@uiowa.edu). *Cofree coalgebras in common abelian monoidal categories*. Preliminary report.

The tensor algebra is a well known construction which carries over to (symmetric) abelian monoidal categories, and produces the free algebra (monoid) on an object V in the category. The existence of a free algebra in the opposite category of an abelian monoidal category C , or the co-free coalgebra on an object V in C is less obvious; the existence of a cofree coring (cofree coalgebra in the category of bimodules over a ring) was left open in [A.Agore, Proc.AMS 139 (2011), 855-863]. Using the special adjoint functor theorem, we show that for many abelian monoidal categories of interest (bimodules, (co)modules over bialgebras B , Yetter-Drinfeld modules, etc.), the answer to this question is positive. In particular, the cofree (co)module coalgebra on a B -(co)module exists. We also determine generators of the category of coalgebras in each of these monoidal categories and give an explicit construction of the cofree coalgebra in each case. We investigate whether such a general construction works for general monoidal categories satisfying certain natural conditions that are met in all the above cases. (Received September 16, 2014)