Partial comodules over Hopf algebras

William Hautekiet
Université Libre de Bruxelles (Belgium)

william.hautekiet@ulb.be

Abstract

A left partial module over a Hopf algebra H is a vector space M equipped with a unital linear map $\rho : H \otimes M \to M$ which satisfies conditions that weaken the usual notion of associativity to *partial associativity*. The category of left partial H-modules is isomorphic to the category of left modules over another algebra H_{par}, which has the structure of a Hopf algebroid. This setting dualizes to (right) partial comodules over H, i. e. vector spaces with a co-unital coaction $M \to M \otimes H$ which satisfies partial coassociativity axioms. However, it turns out that in general there does not exist a coalgebra C for which the category of partial H-comodules is equivalent to the category of (usual) comodules over C. We will show that the category of partial H-comodules is comonadic over Vect_k, hence it is equivalent to the category of Eilenberg-Moore objects of a comonad $\mathbb{C}$. This comonad induces a *relative comonad*, which in turn gives a comonad on the category of complete topological vector spaces.