

A D.G. HOPF ALGEBRA ASSOCIATED TO A SET THEORETICAL SOLUTION OF THE
YANG-BAXTER EQUATION AND COHOMOLOGY

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For a set theoretical solution of the Yang-Baxter equation (X, r) , we define a d.g. Hopf algebra $B = B(X, r)$ containing the group algebra $k[G]$, where $G = \langle x \in X : xy = zt \text{ if } r(x, y) = (z, t) \rangle$, in such a way that $k \otimes_G B \otimes_G k$ and $\text{Hom}_{G-G}(B, k)$ are respectively the homology and cohomology complexes computing quandle/rack homology and cohomology, as defined by knot theorists (Carter, Saito, Jelsovskyb, ElHamadi) and other generalizations of cohomology (e.g. twisted rack cohomology, or Yang-Baxter cohomology). This algebraic structure allow us to show the existence of an associative product in Yang-Baxter cohomology, and a comparison map with Hochschild (co)homology of $k[G]$, that factors trough the Nichols algebra associated to $(X, -r)$.

Joint work with Juliana Garcia Galofre (Universidad de Buenos Aires, Argentina)..