
Hopf25

Xiao Han

Queen Mary University of London, UK
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Hopf Galois extensions of Hopf algebroids

We study Hopf Galois extensions of Hopf algebroids as a generalization of the theory for Hopf algebras. More precisely, we introduce (skew-)regular comodules and generalize the structure theorem for relative Hopf modules. Also, we show that if $N \subseteq P$ is a left \mathcal{L} -Galois extension and Γ is a 2-cocycle of \mathcal{L} , then for the twisted comodule algebra ${}_{\Gamma}P$, $N \subseteq {}_{\Gamma}P$ is a left Hopf Galois extension of the twisted Hopf algebroid \mathcal{L}^{Γ} . We study twisted Drinfeld doubles of Hopf algebroids as examples for the Drinfeld twist theory. Finally, we introduce cleft extension and σ -twisted crossed products of Hopf algebroids. Moreover, we show the equivalence of cleft extensions, σ -twisted crossed products, and Hopf Galois extensions with normal basis properties, which generalize the theory of cleft extensions of Hopf algebras.