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HNN-extension of free Rota-Baxter Lie algebras

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Based on the Groebner-Shirshov bases for free Rota-Baxter Lie algebras [2], we introduce a specific technique for spreading the notion of HNN-extension of groups to the case of free Rota-Baxter Lie algebras in order to obtain an embedding theorem. We recall that HNN-extension of groups states that if A_1 and A_2 are isomorphic subgroups of a group G, then it is possible to find a group H containing G such that A_1 and A_2 are conjugate to each other in H and G is embeddable in H (see [1]). The concept of HNN-extension of free Rota-Baxter Lie algebras is constructed through employing a differential K-algebra of weight λ, that is, an associative K-algebra R together with a linear operator $d : R \to R$ such that

$$d(xy) = d(x)y + xd(y) + \lambda d(x)d(y),\ \forall x, y \in R,$$

and

$$d(1) = 0,$$

where K is unitary commutative ring and $\lambda \in K$. This operator is called a derivation of weight λ or a λ-derivation.

Keywords
HNN-extension, Rota-Baxter algebra, Groebner-Shirshov basis

References

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