Rota-Baxter operators and post-Lie algebra structures on semisimple Lie algebras. (English summary)
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Summary: "Rota-Baxter operators $R$ of weight 1 on $n$ are in bijective correspondence to post-Lie algebra structures on pairs $(g, n)$, where $n$ is complete. We use such Rota-Baxter operators to study the existence and classification of post-Lie algebra structures on pairs of Lie algebras $(g, n)$, where $n$ is semi-simple. We show that for semisimple $g$ and $n$, with $g$ or $n$ simple, the existence of a post-Lie algebra structure on such a pair $(g, n)$ implies that $g$ and $n$ are isomorphic, and hence both simple. If $n$ is semisimple, but $g$ is not, it becomes much harder to classify post-Lie algebra structures on $(g, n)$, or even to determine the Lie algebras $g$ which can arise. Here only the case $n = sl_2(C)$ was studied. In this paper, we determine all Lie algebras $g$ such that there exists a post-Lie algebra structure on $(g, n)$ with $n = sl_2(C) \oplus sl_2(C)$."

Reviewed by Ki-Bong Nam

References