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Extending Structures for Lie Bialgebras

Let $(\mathfrak{g}, [\cdot, \cdot], \delta_{\mathfrak{g}})$ be a fixed Lie bialgebra and V be a vector space. In this paper, we introduce the notion of a unified bi-product of $(\mathfrak{g}, [\cdot, \cdot], \delta_{\mathfrak{g}})$ by V and give a theoretical answer to the extending structures problem, i.e. how to classify all Lie bialgebraic structures on $E = \mathfrak{g} \oplus V$ such that $(\mathfrak{g}, [\cdot, \cdot], \delta_{\mathfrak{g}})$ is a Lie sub-bialgebra up to an isomorphism of Lie bialgebras whose restriction on $\mathfrak{g}$ is the identity map. Moreover, several special unified bi-products are also introduced. In particular, the unified bi-products when $\dim V = 1$ are investigated in detail.

Keywords: Lie bialgebra, extending structure.

MSC: 17A30, 17B62, 17B65, 17B69.