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Realization of representations of the Hom-Lie algebra $\mathfrak{sl}_q(2, \mathbb{C})$ of Jackson.

Abstract

The weight modules of the Lie algebra $\mathfrak{sl}(2, \mathbb{C})$ are well known (for self contained reference see [?]). In the first part of this paper we deal with a realization of weight modules of $\mathfrak{sl}(2, \mathbb{C})$ in the space $t^\nu \mathbb{C}[t, t^{-1}]$, $\nu \in \mathbb{R}$, where $\mathbb{C}[t, t^{-1}]$ is the algebra of Laurent polynomials.

In the second part, we consider the Hom-Lie algebra $\mathfrak{sl}_q(2, \mathbb{C})$ of Jackson where $q \neq 0, 1$. The q -analogue of the above realization in the space $t^\nu \mathbb{C}(q)[t, t^{-1}]$, $\nu \in \mathbb{R}$ are considered. We obtain two kinds of q -modules. The regular q -modules which have limits the modules obtained in the classical realization when q go to 1 . The other q -modules have no limits when q go to 1 and they are called singular modules.