Rings of definable scalars of some $sl_3(\mathbb{C})$-modules

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This a joint work with Mike Prest [4].

In the paper [1], Herzog investigated the ring of definable scalars of the finite-dimensional representations of the Lie algebra $sl_2(\mathbb{C})$ of the 2×2 traceless matrices over the complex field $\mathbb{C}$. This is the ring of definable actions on the category of finite-dimensional $sl_2(\mathbb{C})$-modules that is, the ring to which the action of the universal enveloping algebra, $U = U(sl_2(\mathbb{C}))$ on these modules extends in a definable way. Herzog showed, that this ring,denoted by U' is von Neumann regular and is a universal localisation of U. This work inspired further investigations, on rings of definable scalars of Verma modules [3], on $U_q(sl_2(\mathbb{C}))$-modules (where q is not a root of unity) [2]. It is natural to ask what happens when $sl_2(\mathbb{C})$ is replaced by other simple Lie algebras, in particular by $sl_3(\mathbb{C})$. We are able to obtain the similar results described by [1] if we restrict to the representations which are contained in, or whose dual is contained in, the natural representation of $sl_3(\mathbb{C})$ on the polynomial ring on three generators.

References

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