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$(G, \chi_{\phi})$-equivariant $\varphi$-coordinated quasi modules for vertex algebras. (English) Zbl 07420013
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Summary: To give a unified treatment on the association of Lie algebras and vertex algebras, we study $(G, \chi_{\phi})$-equivariant $\varphi$-coordinated quasi modules for vertex algebras, where $G$ is a group with $\chi_{\phi}$ a linear character of $G$ and $\varphi$ is an associate of the one-dimensional additive formal group. The theory of $(G, \chi_{\phi})$-equivariant $\varphi$-coordinated quasi modules for nonlocal vertex algebra is established in [10]. In this paper, we concentrate on the context of vertex algebras. We establish several conceptual results, including a generalized commutator formula and a general construction of vertex algebras and their $(G, \chi_{\phi})$-equivariant $\varphi$-coordinated quasi modules. Furthermore, for any conformal algebra $C$, we construct a class of Lie algebras $\hat{C}_{\varphi}[G]$ and prove that restricted $\hat{C}_{\varphi}[G]$-modules are exactly $(G, \chi_{\phi})$-equivariant $\varphi$-coordinated quasi modules for the universal enveloping vertex algebra of $C$. As an application, we determine the $(G, \chi_{\phi})$-equivariant $\varphi$-coordinated quasi modules for affine and Virasoro vertex algebras.

MSC:

17B65 Infinite-dimensional Lie (super)algebras
17B69 Vertex operators; vertex operator algebras and related structures

Keywords:

$\varphi$-coordinated module; vertex algebra

References:

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