

Vertex operator algebra 1-point functions and matrix Jacobi forms

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Abstract

For an irreducible module M of a strongly regular vertex operator algebra V , we consider 1-point functions defined by $\text{tr}_M o(v) e^{2\pi i z_1 h_1(0)} \dots e^{2\pi i z_n h_n(0)} q^{L(0)-c/24}$, where $z_j \in \mathbb{C}$ ($1 \leq j \leq n$) and $h_1, \dots, h_n \in V_1$ satisfy appropriate integrality conditions. For $v \in V_{[k]}$, we prove the space spanned by its 1-point functions for the irreducible modules of V is a vector-valued weak matrix quasi-Jacobi form of weight k . Conditions for $v \in V_{[k]}$ are provided which allow for the notion of “quasi” to be omitted. Finally, a partial differential equation intrinsic to V is constructed whose solutions include the 1-point functions.