Commun. Math. Phys. 147, 647–648 (1992)

Communications in Mathematical Physics

Erratum

Semi-Infinite Weil Complex and the Virasoro Algebra

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Received February 21, 1992

Commun. Math. Phys. **137**, 617–639 (1991)

In Sect. 4, on p. 636, we had assumed an incorrect structure of the Fock representations $\mathscr{H}_p$ of the Virasoro algebra, taken from [1], Theorem 1.10 (cf. Fig. 5). In fact, the module $\mathscr{H}_p$ is isomorphic to the Verma module, if $p \leqq 0$, and to the contragradient Verma module, if $p>0$, with highest weight $h'_p = -(p-2)(p+1)/2$ and central charge 28 [2].

For this reason the exact sequences (24), (25), and Proposition 7 on p. 637 are also incorrect. Proposition 7 should read as follows.

Proposition 7. 1) *Let* $m \geqq 0$, $n \leqq 0$ *be of equal parity. Then* $h^j(L_m \otimes \mathscr{H}_n) = \delta_{j,0}$, *if* $m=-n$ *and* 0, *otherwise.*
2) *Let* $m \geqq 0$, $n \leqq 0$ *be of different parity. Then* $h^j(L_m \otimes \mathscr{H}_n) = \delta_{j,1}$, *if* $m=-n-1$ *and* 0, *otherwise.*
3) *Let* $m \geqq 0$ *and* $0<n<m$. *Then* $h^j(L_m \otimes \mathscr{H}_n)=0$ *for any* j.

Proof of parts 1) and 2) follows from the isomorphism $\mathscr{H}_n \simeq M_{(h'_n, 28)}$ for $n \leqq 0$, Proposition 5, and the short exact sequence

$$0 \to L_\chi \to M^*_\chi \to M^*_{\chi 1} \to 0 .$$

Part 3) can be proved in a similar fashion. □

This corrects (and simplifies) the statement of Theorem 1 on p. 628.

Theorem 1. 1) *Let* $p=-2m$, $m \geqq 0$. *Then* $h_p^{0,l}=1$, *if* $l \leqq m$, *and* $h_p^{j,l}=0$, *otherwise.*
2) *Let* $p=-2m-1$, $m \geqq 0$. *Then* $h_p^{1,l}=1$, *if* $l \leqq m$ *and* $h_p^{j,l}=0$, *otherwise.*
3) *Let* $p=-2m+1$, $m \leqq 0$, *Then* $h_p^{0,l}=1$, *if* $l \geqq m$, *and* $h_p^{j,l}=0$, *otherwise.*
4) *Let* $p=-2m+2$, $m \leqq 0$. *Then* $h_p^{-1,l}=1$, *if* $l \geqq m$ *and* $h_p^{j,l}=0$, *otherwise.*

Proof. Let $p=-2m$, $m \geqq 0$. By Theorem 4, $h_p^{j,l} = \sum_{k \geqq 0} h^j(L_{|l|+2k} \otimes \mathscr{H}_{p+l})$. It is equal to $\delta_{j,0}$, if $l \leqq m$, and 0, if $l>m$, by Proposition 7.

In other cases the proof is similar. □

Since $d_p^{j,l}=h_p^{j,l}+h_p^{j-1,l}$ (cf. p. 628), Theorem 2 on p. 628 should read as follows.

Theorem 2. 1) *Let* $p=-2m$, $m\geqq 0$. *Then* $d_p^{0,l}=d_p^{1,l}=1$, *if* $l\leqq m$, *and* $d_p^{j,l}=0$, *otherwise.*
2) *Let* $p=-2m-1$, $m\geqq 0$. *Then* $d_p^{1,l}=d_p^{2,l}=1$, *if* $l\leqq m$, *and* $d_p^{j,l}=0$, *otherwise.*
3) *Let* $p=-2m+1$, $m\leqq 0$. *Then* $d_p^{0,l}=d_p^{1,l}=1$, *if* $l\geqq m$, *and* $d_p^{j,l}=0$, *otherwise.*
4) *Let* $p=-2m+2$, $m\leqq 0$. *Then* $d_p^{0,l}=d_p^{-1,l}=1$, *if* $l\geqq m$, *and* $d_p^{j,l}=0$, *otherwise.*

References

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Communicated by A. Jaffe