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Algebras of Virasoro type, energy-momentum tensor, and decomposition operators on Riemann surfaces. (English. Russian original) Zbl 0684.17012

Funct. Anal. Appl. 23, No. 1, 19-33 (1989); translation from Funkts. Anal. Prilozh. 23, No. 1, 24-40 (1989).

This is the third in a series of papers by the same authors [see ibid. 21, No.2, 46-63 (1987; Zbl 0634.17010)] and 21, No.4, 47-61 (1987; Zbl 0659.17012)] developing a program of the operator quantization of multiloop diagrams in the bosonic string theory. The approach departs from a twice pointed non-singular Riemannian surface Γ as an algebro-geometric model of a bosonic string; the fixed points $P_{\pm}$ correspond to the conformal compactification of the string world sheet at $t \to \pm\infty$ in the Minkowski space. The so-called 'almost graded' central extensions of certain tensor algebras on Γ play a crucial role in the operator theory of interacting strings; they are analogues of the Virasoro and Heisenberg algebras. The§ 1 contains a reminder of the basic ideas in a 'more appropriate for the sequel' form.

Operator realization of a bosonic string in the Fock space $\mathcal{H}^{\pm}$ of Dirac fermions on Γ is discussed in the §2.

In the case of genus $g > 0$ the energy-impulse tensor proves to be ill- defined, and the §3 is devoted to the introduction of its proper substitution, the energy-impulse 'pseudotensor' on Γ, which is defined invariantly and depends on the triple Γ, P_+, P_- only.

The concluding §4 sketches a program of extending the results presented beyond the bosonic sector of the closed string, via the BRST techniques.

Reviewer: V.Pestov

MSC:

17B65	Infinite-dimensional Lie (super)algebras
81Q30	Feynman integrals and graphs; applications of algebraic topology and algebraic geometry
81S10	Geometry and quantization, symplectic methods
81T60	Supersymmetric field theories in quantum mechanics
30F99	Riemann surfaces
17B67	Kac-Moody (super)algebras; extended affine Lie algebras; toroidal Lie algebras

Cited in **5** Reviews
Cited in **19** Documents

Keywords:

normal ordering; almost-graded algebras; operator quantization; bosonic string; Riemannian surface; Fock space; Dirac fermions

Full Text: DOI

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