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Kac-Moody algebras, the Monstrous Moonshine, Jacobi forms and infinite products.

Number theory, geometry and related topics (Iksan City, 1995), 13–82, *Pyungsan Inst. Math. Sci., Seoul*, 1996.

This is an excellent survey article about the recent impressive works of R. E. Borcherds. The results of Borcherds presented in this article are (i) construction of the Monster Lie algebra, (ii) proof of the Moonshine conjectures, (iii) construction of automorphic forms on the orthogonal group $O_{s+2,2}(\mathbf{R})$, (iv) infinite product representations of meromorphic modular forms, and (v) construction of Jacobi forms.

The article is organized as follows: In §2, some properties of Kac-Moody Lie algebras relevant to the subsequent discussions are collected. In §3, Borcherds' proof of the Moonshine conjectures is discussed. In §4, the theory of Jacobi forms, especially Borcherds' construction of almost holomorphic Jacobi forms, is presented. Finally, in §5, Borcherds' infinite product formula and modular forms are discussed. In the final remarks, open problems are formulated. There are several appendices; in Appendix A, classical modular forms are discussed; in Appendix B, the Kohnen "plus" space and the Maass "Spezielschar" are briefly discussed; in Appendix C, geometric aspects of the orthogonal group $O_{s+2,2}(\mathbf{R})$ are presented, and in the final appendix, some well-known properties of the Leech lattice and Jacobi theta functions are discussed.

{For the entire collection see [MR1404965 \(97b:11002\)](#)}

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