

VERTEX ALGEBRAS, ASSOCIATED VARIETIES AND MODULAR FORMS

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ABSTRACT. Vertex algebras are sophisticated algebraic structures that allow the mathematical formalism of what physicists call chiral algebras in two-dimensional conformal field theory. To such a structure one can attach invariants of different natures: its automorphism group, its character (a formal series), its associated variety (a Poisson variety), etc. These invariants reveal unexpected connections between different domains. I will illustrate this phenomenon with historical and more recent examples. In particular, I will explain how to exploit these invariants to obtain nontrivial isomorphisms between W-algebras at admissible levels. To study a more general setting, one can use totally different techniques developed more recently.