Turning conformal field theory into combinatorics

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Abstract

Conformal Field Theory (CFT) is a quantum field theory which describes the the behavior of physical fields which are invariant under conformal transformations, i.e. mappings which preserve angles between tangent vectors. Since the 1980s CFT has been studied by algebraic geometers because of a close connection between its two-dimensional incarnation and the moduli space of vector bundles on an algebraic curve. We give an overview of some recent work in replacing questions about these objects with questions about the combinatorics of certain affine semigroup algebras. Given sufficient time, we will also state some open problems.

Keywords: field theory, algebraic curve, vector bundle, semigroup algebra.