

Title: Primary fields in free CFT4

Abstract:

Counting formulae for general primary fields in free four dimensional conformal field theories of scalars and fermions are derived. These are used to count primaries which obey extremality conditions defined in terms of the dimensions and left or right spins (i.e. in terms of relations between the charges under the Cartan subgroup of $SO(4,2)$). The construction of primary fields for scalar field theory is mapped to a problem of determining multi-variable polynomials subject to a system of symmetry and differential constraints. For the extremal primaries, we give a construction in terms of holomorphic polynomial functions on permutation orbifolds.