Modular Constraints on Conformal Field Theories with Currents

Tuesday 18 July 2017 16:00 (1 hour)

Using the modular bootstrap, we study the constraints on the spectrum of c>1 unitary two-dimensional conformal field theories with holomorphic currents. Imposing a gap in the twist, we obtain the numerical upper bound on conformal dimension of the lowest primary states. We find that diverse rational conformal field theories are realized on the numerical boundary, including the level-1 Wess-Zumino-Witten models for Deligne's exceptional Lie algebras and cousins of the extremal conformal field theories. Their low-lying spectrum and corresponding degeneracies are numerically analyzed, this enable us to confirm the structure of modular invariant partition function via Virasoro character decomposition. We also extend this analysis to the rank-k W-algebra case, the numerical test suggest that the unitary irreducible representations are allowed only for c>=k.

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