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Quasi-characters in $\widehat{su}(2)$ current algebra at fractional levels

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The unitary highest weight representations of integral levels of $\widehat{su}(2)$ current algebra conformal field theories (CFTs) satisfy all properties of a rational CFT (RCFT), but the story is not straightforward at admissible fractional levels. The admissible levels are labelled by two natural coprime numbers $(p \geq 2, u)$ such that the level is $m = p/u - 2$.

We show that almost every fractional admissible level $\widehat{su}(2)_m$ current algebra exhibits one or more quasi-character(s). We find three special classes without quasi-characters: the sequence $(p = 2, u = 2N + 1)$, where the admissibility condition is saturated, at positive half-odd integer levels labelled by $(p = 2N + 3, u = 2)$, and an isolated point $(p = 3, u = 4)$. We also relate the characters of these three classes with characters of RCFTs corresponding to integral levels of $\widehat{su}(2)$ and $\widehat{so}(5)$. The sequence with $u = 2$ is quite intriguing and seems to defy most of the usual CFT descriptions (except possibly the *log* CFT). We also report two criteria to eliminate character vectors of the fractional admissible level $\widehat{su}(2)_m$ current algebra at $(p \in \text{prime}, u \in \text{prime})$ and $(p, Np - 1)$ where $N \in \mathbb{N}$, admitting quasi-characters, as character vectors of an RCFT. Based on 2208.09037.

Session

Formal Theory

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