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Orbifold Construction in Subfactors

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Abstract: We use the lattice models to determine the obstructions to the flatness of the orbifold connections in some finite depth subfactors.

0. The motivation of the present work is the question raised in [1]. In [1], the author applied orbifold construction, first used in [2], to the subfactors coming from the Hecke algebra. The key notion is the flatness of the connection in [3]. A connection is an assignment of a complex number to cells, and flatness is a condition on the connection. A more detailed description is included in the appendix. To prove the flatness, one needs certain identities involving a large number of quantities determined by the connection. For $SU(N)$, N odd, and subfactors corresponding to vector representations of $SU(N)$, the flatness of the orbifolding subfactors can be derived from (See [1]):

$$\begin{array}{ccccc} A_0 & \to & \cdots & \to & A_j \\ {}^{\rho}\downarrow & & & & \downarrow^{\eta} \\ \vdots & & & & \vdots \\ \downarrow & & & & \downarrow \\ * & & & & * \\ \uparrow & & & & \uparrow \\ \vdots & & & & \vdots \\ {}^{\rho}\uparrow & & & & \uparrow^{\eta'} \\ A_0 & \to & \cdots & \to & A_j \end{array} = c\delta_{\mu^j(\rho),\eta}\delta_{\eta,\eta'} \qquad (1)$$

Here c is a constant. (By using simple argument one can show $c = 1$.) The symbol on the right-hand side is the notation for the connections, see [1, 2, 3] or the appendix for the precise definitions. In [1], (1) is proved under certain assumptions by using the flatness of Jones projections. It seems to be hard to use this method