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On the eight-vertex model at its supersymmetric point

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In this talk, I consider the eight-vertex model on the square lattice with statistical weights a, b, c, d that obey the relation $(a^2 + ab)(b^2 + ab) = (c^2 + ab)(d^2 + ab)$. For an odd number $L = 2n + 1$, $n \geqslant 0$, of vertical lines and periodic boundary conditions along the horizontal direction, its transfer matrix possesses the special eigenvalue $\Theta_n = (a+b)^{2n+1}$. Its existence can be proven with the help of a hidden supersymmetry. I will discuss the corresponding eigenvectors and present new sum rules for these vectors. They allow one to compute some of their components that were conjectured in 2009 by Bazhanov and Mangazeev and are related to the Painlevé VI equation. Furthermore, I will present new results on the simplest correlation functions for these eigenvectors.

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