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Domino tilings of generalised Aztec triangles and determinant evaluations

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Di Francesco introduced Aztec triangles as combinatorial objects for which their domino tilings are equinumerous with certain sets of configurations of the twenty-vertex model. He conjectured a closed form product formula for the numbers of these tilings, respectively of these configurations. The formula was proved by Christoph Koutschan using Zeilberger's holonomic Ansatz and heavy calculations using computer algebra.

In my talk I will generalise Di Francesco's construction of Aztec triangles. The main result is that also the number of domino tilings of these *generalised* Aztec triangles is given by a closed form product formula. The proof proceeds by translating the domino tilings into non-intersecting lattice paths and by using the Lindström-Gessel-Viennot theorem to obtain a determinant. The final - and "as usual" most difficult - step then consists in the evaluation of this determinant.

There is a whole zoo of determinant evaluations related to this problem.

This is joint work with Sylvie Corteel and Frederick Huang on the one hand, and with Christoph Koutschan and Michael Schlosser on the other hand.

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