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Eight Queens and More

Abstract for the Combinatorics Seminar 2009 March 10

In how many ways can q queens be placed on an n × n chessboard so no two queens attack each other? What about other chess pieces, like bishops or knightriders (a fairy chess piece)? This generalization of the famous n-queens problem can be treated by a hyperplane-arrangement generalization of Ehrhart's theory of counting lattice points in a convex polytope. An ingredient in the Ehrhart-type formula is the least common denominator of the "vertices" of the polytope + the arrangement; this number depends on the Kronecker product of two matrices.

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