Solving Hexagonal n-Queens

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The problem *Hex n-Queens* is a version of the classic n-Queens problem for hexagonal chess as defined by Władysław Gliński. Given a hexagonal board of edge length n, Hex n-Queens asks whether $2n-1$ mutually-nonattacking queens can be placed on the board. Vaclav Kotesovec conjectures that a solution exists for every edge length $n \geq 12$. We have constructed solutions of Hex n-Queens for n $= 12, \ldots, 35$ by converting Hex n-Queens to the satisfiability problem (SAT) and applying a SAT solver. This extends the largest previously known solutions from $n = 20$ to $n = 35$. If Kotesovec's conjecture holds, the decision problem Hex n-Queens can be solved in constant time and therefore is in the complexity class P. We show that a variant of Hex n-Queens where cells may be occupied by walls is NP-complete.

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