An Improved Lower Bound for Domination Numbers of the Queen's Graph

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Abstract

The queen's graph Q_n has the squares of the $n \times n$ chessboard as its vertices; two squares are adjacent if they are in the same row, column, or diagonal. Let $\gamma(Q_n)$ be the minimum size of a dominating set of Q_n. It has been proved that $\gamma(Q_n) \geq (n-1)/2$ for all n. Known dominating sets imply that $\gamma(Q_n) = (n-1)/2$ for $n = 3, 11$.

We show that $\gamma(Q_n) = (n-1)/2$ only for $n = 3, 11$, and thus that $\gamma(Q_n) \geq \lceil n/2 \rceil$ for all other positive integers n.