New Upper Bounds on the Distance Domination Numbers of Grids

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In his 1992 Ph.D. thesis Chang identified an efficient way to dominate $m \times n$ grid graphs and conjectured that his construction gives the most efficient dominating sets for relatively large grids. In 2011 Gonçalves, Pinlou, Rao, and Thomassé proved Chang's conjecture, establishing a closed formula for the domination number of a grid. In March 2013 Fata, Smith and Sundaram established upper bounds for the k-distance domination numbers of grid graphs by generalizing Chang's construction of dominating sets to k-distance dominating sets. In this paper we use algebraic and geometric arguments to improve the upper bounds established by Fata, Smith, and Sundaram for the k-distance domination numbers of grids.

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