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Emily Hale-Sills*, Department of Mathematics and Statistics, Smith College, Northampton, MA 01063, and **Kim Lockrow**, **Emily Merrill** and **Samantha Lowe**. *Exponential Domination in Grid Graphs*. Preliminary report.

We consider a variation on the domination number of a graph. Let G be a graph, $S \subset V$ a subset of the vertices and $d(u, v)$ the distance between vertices u, v . Define

$$w_S(v) = \begin{cases} \sum 1/(2^{d(u,v)-1}) & \text{if } v \notin S, \\ 2, & \text{if } v \in S \end{cases}$$

S is an *exponential dominating set* if for all vertices v , $w_S(v) \geq 1$. The exponential dominating number, $\gamma_e(G)$ is the least number of vertices in an exponential dominating set. This idea was introduced in a recent paper of Dankelmann et al. Here we give results for the exponential dominating number for various classes of grid graphs. (Received September 19, 2010)