1163-05-78 **Henry L Fleischmann*** (henryfl@umich.edu), **Daniela A Elizondo** (delizondo@hmc.edu) and **Rachel H Thornton** (rachelhthornton@utexas.edu). *Efficient (j,k)-Domination on Chess Graphs.*

Graphs defined by the legal moves of a chess piece are a classical setting for efficient domination. For a graph G, a function $f : V(G) \to \{0, 1, \ldots, j\}$ is an *efficient (j,k)-dominating function* if, for all $v \in V(G)$,

$$\sum_{w \in N[v]} f(w) = k,$$

where $N[v]$ is the closed neighborhood of v (introduced by Rubalcaba and Slater, 2007).

Generalizing our complete characterization of efficient (j,k)-domination on King's graphs, we prove by construction that $G \boxtimes H$ is efficiently (j,k)-dominatable if and only if both G and H are. Additionally, we describe several necessary conditions for efficient (j,k)-domination, following our observations on Bishop's graphs.

On the torus, the Queen's and Bishop's graphs are realizable as Cayley graphs. We apply character theory to calculate the spectra of these graphs, through which we determine their efficient (j,k)-dominating functions.

For the standard $n \times n$ Queen's graph, we exploit an equitable partition to show computationally that, for $4 \leq n \leq 556$, efficient (j,k)-domination occurs only when $n = 10$. Expanding this approach, we construct an infinite class of graphs with an efficient (j,k)-dominating function from analogous equitable partitions. (Received August 10, 2020)