1145-90-952 **Franklin Kenter** and **Daphne Skipper*** (skipper@usna.edu). *IP bounds on pebbling numbers of Cartesian-product graphs.*

A pebbling move takes two pebbles from a single vertex in a graph and places one pebble on an adjacent vertex. The pebbling number of a graph G is the smallest number π_G such that, given any vertex k of G and any assignment of π_G pebbles to the vertices of G, there exists a sequence of pebbling moves that places a pebble on k. Computing π_G is provably difficult. Graham's conjecture states that the pebbling number of the Cartesian-product of two graphs G and H, denoted $G \square H$, is no greater than $\pi_G \pi_H$.

This study combines the focus of developing a computationally tractable method for generating good bounds on $\pi_{G \square H}$, with the goal of providing evidence for (or disproving) Graham's conjecture. In particular, we present a novel integer-programming (IP) approach to bounding $\pi_{G \square H}$ that results in significantly smaller problem instances compared with existing IP approaches to graph pebbling. Our approach leads to an improvement on the best known bound for $\pi_{L \square L}$, where L is the Lemke graph. $L \square L$ is among the smallest known potential counterexamples to Graham's conjecture. (Received September 17, 2018)