1120-15-267 **Travis Peters** (tpeters@iastate.edu) and **Michael Young*** (myoung@iastate.edu). *A Linear Algebraic Approach to LIGHTS OUT! on $G\Box P_t$.*

The game LIGHTS OUT! is played on a square grid of buttons; each button may be on or off. Pressing a button changes the on/off state of the light of the button pressed and of all its vertical and horizontal neighbors. Given an initial configuration of buttons that are lit, the object of the game is to turn all the lights off. The game can be generalized to arbitrary graphs. We investigate graphs of the form $G\Box P_t$. In particular, we extend properties of the Fibonacci polynomials to matrices in order to provide conditions for which $G\Box P_t$ is universally solvable. (Received February 23, 2016)