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**Lindsay A Erickson\*** (lindsay.erickson@augie.edu), 2001 S Summit Avenue, FSC #383, Sioux Falls, SD 57197, and **Bryce Allen Christopherson**. *Edge Nim on trees and its surprising connections to commutative algebra*.

Edge Nim is a combinatorial game played on finite regular graphs with positive, integrally weighted edges. Two players alternately begin from a fixed starting vertex and move to an adjacent vertex, decreasing the weight of the incident edge to a strictly non-negative integer as they travel across it. The game ends when a player is confronted by a position where no incident edge has a nonzero weight (or, that is to say, when the player is unable to move). In the normal form, this player loses, and in the misère form, this player wins. In all previous literature, methods employed for finding solutions were limited to graph theoretic structural arguments and Nim sums. We present an alternate, algebraic approach to edge Nim on graphs for both the normal and misère forms, revealing not only a new method for attacking combinatorial games, but a complete, computationally inexpensive solution to Nim on tree graphs. This approach also suggests that the solution to Nim on trees may be a component of a larger algebraic structure resolving Nim on all graphs. (Received February 12, 2016)