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Martin M Salgado-Flores* (mmsalgadoflore@email.wm.edu), 802 Hamder Way, Newport News, VA 23602, and **Yu-Min Chung** and **Sarah Day**. *Dynamics at a Finite Resolution: A Study of Isolating Neighborhoods*. Preliminary report.

Conley Index Theory has inspired the development of rigorous computational methods to study dynamics. These methods construct *outer approximations*, a combinatorial representation of the system, which allows us to represent the system as a directed graph. Invariant sets appear as combinations of vertices and edges on the resulting digraph. Conley Index Theory relies on isolating neighborhoods, which are maximal invariant sets that meet an isolation condition, to describe the dynamics of the system. In this work, we present a computationally efficient and rigorous way of computing all isolating neighborhoods given an outer approximation. We improve upon an existing algorithm that "grows" isolating neighborhoods individually and requires an input size of 2^n , where n is the number of grid elements used for the outer approximation. (Received September 15, 2014)