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Rigorous Validation of Isolating Blocks for Flows

In this talk, we present a new method for finding and rigorously verifying a special type of index pairs for finite-dimensional flows, namely isolating blocks and their exit sets. Our method makes use of a recently developed adaptive algorithm for rigorously determining the location of nodal sets of smooth functions, which combines an adaptive subdivision technique with interval arithmetic. By characterizing an exit set as a nodal domain, we are able to determine a valid index pair and proceed to compute its Conley index. Our method is illustrated using several examples for three-dimensional flows.