DYNAMICAL SYSTEMS AND ORDINARY DIFFERENTIAL
EQUATIONS AND APPLICATIONS

# Multigrid Fast Sweep Method For Computation of Isostables and Isochrons

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We propose a fast iterative multigrid algorithm for the computation of isostables and isochrons for dynamical systems with stable limit cycles or fixed points in high dimensions. We solve a first-order static Hamilton–Jacobi equation with a constant source term using a Eulerian Fast Sweeping Method developed for this type of problem. We reduce the number of iteration of the standard Fast Sweeping Method using nested grids and demonstrate the speed up on several illustrative examples.

**Keywords:** isostables, isochrons, Hamilton–Jacobi, multigrid