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Weitao Chen, Ching-Shan Chou and Chiu-Yen Kao* (kao@math.ohio-state.edu). *Fast Sweeping Methods for Steady State Problems of Hyperbolic Conservation Laws with Source Terms.*

We propose several simple fast sweeping methods to approximate the steady state solutions of hyperbolic conservation laws with source terms. The original fast sweeping methods were developed for stationary Hamilton-Jacobi equations. The methods relies on numerical Hamiltonian, Gauss-Seidel type nonlinear iterative method, and a finite number of sweeping directions to compute the stationary viscosity solution efficiently. We extend the fast sweeping methods to solve hyperbolic conservation laws with source terms. By incorporating the numerical flux and relaxation of iterative scheme, we developed efficient methods which can capture correct stationary viscosity solutions even when discontinuities appear. Extensive numerical examples in both scalar and system of equations in one and two dimensions illustrate the efficiency and accuracy of the new approaches. (Received December 07, 2011)