1069-65-8 **Jue Yan*** (jyan@iastate.edu), 396 carver Hall, Department of Mathematics, Iowa State University, Ames, IA 50010. *A Local Discontinuous Galerkin Method for directly solving Hamilton-Jacobi Equations.*

In this paper we propose a new local discontinuous Galerkin method to directly solve Hamilton-Jacobi equations. The scheme is a natural extension of the monotone scheme. For the linear case with constant coefficients, the method is equivalent to the discontinuous Galerkin method for conservation laws. Thus, stability and error analysis are obtained under the framework of conservation laws. For both convex and noneconvex Hamiltonian, optimal (k+1)-th order of accuracy for smooth solutions are obtained with piecewise k-th order polynomial approximations. The scheme is numerically tested on a variety of one and two dimensional problems. The method works well to capture sharp corners (discontinuous derivatives) and have the solution converges to the viscosity solution. (Received September 27, 2010)