

Discontinuous Galerkin Method with Artificial Viscosity for Compressible Fluid Flows

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Abstract

In this study, a high order discontinuous Galerkin method with artificial viscosity for compressible fluid flows is presented. In the present discontinuous Galerkin method, artificial viscosity is added for suppressing spurious oscillations in the numerical solutions with strong shock waves. The amount of artificial viscosity is determined by a dilatation based shock sensor. Numerical simulations are presented to demonstrate the effect of artificial viscosity, the results of one-dimensional shock tube problems and two-dimensional airfoil flow problems show that the artificial viscosity method could reduce solution oscillations near discontinuities and improve the robustness of high order discontinuous Galerkin method with strong shocks.

Keywords: **discontinuous Galerkin method, compressible flow, artificial viscosity.**