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		authors	• Dong, Wei	NOT DUPLICATES	1093
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		abstract	The objective of this dissertation is to develop and apply kinetic schemes for the numerical solution of 3-D compressible Euler and ideal Magnetohydrodynamic: MHD) equations. By employing the so-called moment method strategy , kinetic schemes for the compressible Euler and ideal MHD equations are derived from the collisionless Boltzmann equation, which is upwind discretized. Then the moments of the upwind discretized collisionless Boltzmann equation are taken with a collision invariant vector and the appropriate distribution function to obtain the numerical scheme for the continuum Euler and ideal MHD equations. In this dissertation, for both the Euler and ideal MHD equations, initially the first-order accurate time-explicit KFVS and KWPS algorithms are derived, and then the first-order accurate time-implicit KFVS and KWPS algorithms are developed. The derivations are presented in the 3-D generalized coordinate system. A 3-D computational code for the solution of compressible Euler and ideal MHD equations in generalized curvilinear coordinate system is written and validated. The code has been written for the first-order time-explicit KWPS algorithm. However, it can be easily extended to include the time-implicit KWPS algorithm as well as both the time-explicit and time-implicit KFVS algorithms. The code is applied to calculate the inviscid Supersonic flow past an axisymmetric blunt body with and without the presence of a magnetic field. The effect of magnetic field in reducing the strength of the bow shock is analyzed. This dissertation makes a fundamental contribution to the development and application of kinetic schemes for the solution of fluid dynamics equations		
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