The Hong Kong University of Science and Technology

Department of Mathematics

Seminar on Scientific Computation

Two-stage fourth-order gas-kinetic scheme for compressible flows

By

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Abstract

For computational fluid dynamics, the generalized Riemann problem (GRP) solver and the second-order gas-kinetic scheme (GKS) provide a time-accurate flux function starting from a discontinuous piecewise linear flow distributions around a cell interface. In this paper, based on the two-stage Lax–Wendroff-type time-stepping method and the second-order GKS flux function, a fourth-order gas-kinetic scheme is constructed for the Euler and Navier–Stokes equations. In comparison with the formal one-stage time-stepping third-order gas-kinetic solver, the current method not only reduces the complexity of the flux function, but also improves the accuracy of the scheme. Most importantly, the robustness of the fourth-order GKS is as good as the second-order one. With the multi-component BGK model, this approach is extended to the numerical simulation for the compressible multi-component flow. Many numerical tests are presented to validate the current approach.

Date: *Wednesday, 2 August 2017*

Time: *4:00p.m.-5:00p.m.*

Venue: *Room 2131A, Academic Building (near lift 19), HKUST*

All are welcome!