The Hong Kong University of Science and Technology

Department of Mathematics

PhD THESIS EXAMINATION

High-order Gas-kinetic Schemes for Turbulence Modeling and Simulation

By

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ABSTRACT

In this thesis, we mainly focus on the development of high-order gas-kinetic scheme (HGKS) for the three-dimensional flow modeling and simulations, namely the thermal non-equilibrium flows and the turbulent flows. Along the line of GKS-type time relaxation model, an extended kinetic BGK equation with multiple temperature is proposed and used in the flow computations. Computational results confirm the efficiency, high-order accuracy, and outstanding robustness of the HGKS. The HGKS provides a valuable tool for the modeling and simulation of turbulent flow.

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