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Gas-kinetic BGK Schemes for 3D Viscous Flow[1] JIN JIANG, YUE-HONG QIAN, Shanghai University — Gas-kinetic BGK scheme developed as an Euler and Navier-Stokes solver is dated back to the early 1990s. There are now numerous literatures on the method. Here we focused on extending this approach to 3D viscous flow. Firstly, to validate the code, some test cases are carried out, including 1D Sod problem, interaction between shock and boundary layer. Then to improve its computational efficiency, two main convergence acceleration techniques, which are local time-stepping and implicit residual smoothing, have adopted and tested. The results indicate that the speed-up to convergence steady state is significant. The last is to incorporate turbulence model into current code with the increasing Reynolds number. As a proof of accuracy, the transonic flow over ONERA M6 wing and pressure distributions at various selected span-wise directions have been tested. The results are in good agreement with experimental data, which implies the extension to turbulent flow is very encouraging and of good help for further development.

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