

This paper describes parallel computing approach for simulating turbulent flows using a moment base lattice Boltzmann method. The distribution functions of the lattice Boltzmann method are expressed by corresponding moments. Choosing proper relaxation times for higher order moments, a minimum numerical dissipation is implicitly added to stabilise the method at high Reynolds numbers. Validation of the method is made by computing free decaying periodic turbulent flows and fully developed turbulent channel flows on a GPU platform. Though the present method requires additional work to calculate the higher order moments, it is shown that additional computational cost is negligible in the GPU computing. The numerical results stably obtained for the turbulent flows are in good agreement with those of a pseudo-spectral method and corresponding DNS database.