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Multi-relaxation-time lattice Boltzmann model for incompressible flow. (English)

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Summary: In this Letter an incompressible MRT-LB model has been proposed. The equilibria in momentum space are derived from an earlier incompressible LBGK model by Guo et al. Through the Chapman-Enskog expansion the incompressible Navier-Stokes equations can be recovered without artificial compressible effects. The steady Poiseuille flow, the driven cavity flow and the double shear flow have been carried on by the incompressible MRT-LB model. The numerical simulation results agree well with the analytical solutions or the existing results. It is found that the incompressible MRT-LB model shows better numerical stability.

MSC:

76M28 Particle methods and lattice-gas methods

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